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The Mesolithic-Neolithic transition in south west England.

THE MESOLITHIC-NEOLITHIC TRANSITION IN SOUTH WEST ENGLAND

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ABSTRACT

This thesis seeks to explain the mechanisms by which the transition to farming occurred in south west England. This is achieved by the recovery of primary data through excavation and fieldwork at Birdcombe and Totty Pot, two late Mesolithic sites in Somerset; by an assessment of the flint collections for North Somerset; by an appraisal of the radiocarbon dates available for the later Mesolithic and early Neolithic periods in Britain and by a critical assessment of the palaeoenvironmental evidence that has previously been used to suggest social complexity of hunter-gatherer societies.

The transition to farming in Britain occurred in a different way to that in Europe. This means that the 'availability' model cannot be applied to the existing database without considerable modification as 'transitional' assemblages do not exist in Britain. The idea of a mixed farming system being in place at the beginning of the Neolithic does not equate with the archaeological evidence. Hunter-gatherer society was not necessarily becoming more sedentary at the end of the Mesolithic, as mobility persisted well into the Neolithic period and a full agricultural system is not seen in the archaeological record until the beginning of the Bronze Age. A new model can be put forward for the regional transition to farming, based on the excavation evidence and new radiocarbon dates for Birdcombe, which takes into account the association of flint typology with topographical variation.

Dedication

This thesis is dedicated to Sara and Annabel

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I would like to thank the following people for their support throughout my four years of research: for valuable advice and support, my supervisor, Professor Richard Harrison; Larry Barham for advice, discussion and excavation with the third year undergraduates and postgraduates of 1997 at Bristol for digging the Birdcombe site; the undergraduate and postgraduate students who dug at Totty Pot in 1998; Sarah Hook and Andrew Eden who supervised at Totty Pot; David Wyatt the Birdcombe landowner and the Marquess of Bath, without whose permission both Birdcombe and Totty Pot would not have been excavated; the students, friends and members of the CBA SW who took part in fieldwalking, surveying and excavation on both the Birdcombe and Totty Pot sites; Keith Gardner and Jean Dagnall for Birdcombe archive material; Roger Jacobi (British Museum) for classifying the Birdcombe and Totty Pot flint collections; Marek Zvelebil (Sheffield), Julian Thomas (Manchester), Nick Thorpe (King Alfred's College Winchester) and Stephen Aldhouse-Green (University of Wales College Newport) for advice and discussion on the transition; Alan Saville (National Museums of Scotland) for unpublished data from Wells Cathedral; Peter Woodman (U.C.C.) for unpublished information and discussion on the Irish Mesolithic; Simon Day and Chris Richards (Woodspring Museum) for geological information; Christopher Hawkes (Wells Museum) for unpublished information from the Totty Pot site and access to the UBSS collections; Steve Minnitt (Taunton), Jane Allwood (Woodspring), Margaret and John Chapman (Axbridge) for access to museum collections; Roy Froome for unpublished Wawcott data; Liz Aveling (Bradford) for the Birdcombe woodtar analysis; Richard Evershed (School of Chemistry, Bristol) for analysing the organic material from the Birdcombe 1997 excavation; Hannah Firth for photographs of the Sweet Track; Christopher Norman for drawing the Birdcombe and Totty Pot flint collections and information on the flint from Somerset; Sue Grice (Bristol) for her time and help with the drawings.

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AUTHOR'S DECLARATION

I declare that the work in this dissertation was carried out in accordance with the Regulations of the University of Bristol. The work is original except where indicated by special reference in the text and no part of the dissertation has been submitted for any other degree.

Any views expressed in the dissertation are those of the author and in no way represent those of the University of Bristol.

The dissertation has not been presented to any other University for examination either in the United Kingdom or overseas.

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CHAPTER 1

AIMS AND FOCUS OF THE INVESTIGATION

Introduction

The Mesolithic-Neolithic transition has traditionally been seen as an economic phenomenon of colonising farmers moving across Europe bringing polished stone and pottery, domesticated animals and cereals that made up the complete Neolithic 'package' and who rapidly absorbed or transplanted the indigenous population with a superior lifestyle. The introduction of agriculture has been associated with sedentism and a growing population, which in turn was seen as either a cause, or as a result of intensive food production. This view has partly been due to Childe's label of a 'Neolithic revolution' (1936) and by Ammerman and Cavalli-Sforza's 'wave of advance' model that did much to perpetrate the idea of a steady movement across Europe by farming groups who ousted the indigenous population to set up permanent occupation and construct monuments (Ammerman and Cavalli-Sforza 1971; 1984). To validate their model, Ammerman and Cavalli-Sforza used radiocarbon dates to trace a pattern of movement by farmers in an east-west direction across Europe. The terms 'Neolithic' and 'farming' have, therefore, become synonymous.

On technological grounds the Neolithic was separated chronologically from the Mesolithic when polished stone, pottery and domesticated cereals and animals made an appearance in the archaeological record. A widespread view of the economic model has led to the presumption that with farming came sedentism and although the results of more recent ethnographic studies have led researchers to question this view, the link between farming and permanent settlement in contemporary society has made the association difficult to erase.

The social structure of the Neolithic has been seen as one of a steady process of change, encouraged by both processual and post-processual archaeologists, with the concept of ideology and power being seen in the monumental structures that appear in the landscape for the first time. A progression has been suggested from the savagery of hunter-gatherers to the more complex leaders of tribes and further, to chiefdoms and elite societies that take part in exchange of prestige goods and control knowledge and ritual. This progression has given little or no credence to the role that indigenous hunter-gatherers may have played in the transition and the relationship they may have had with a society that had knowledge of different tool techniques, a different subsistence base and building construction (Whittle 1996).

More recently, however, these views have been challenged and many divergent models have been put forward that seek to explain the transition, both in a British and in a European context. Twenty years on from the 'wave of advance' model, the concept of the total adoption of farming techniques by hunter-gatherers as a complete shift in economy has lost ground. The idea that a colonising mechanism like that of the *Bandkeramik (LBK)* groups who brought a complete village based system at the beginning of the seventh millennium BP into north west Europe, could apply to the rest of Europe and Britain, is not now completely accepted. The fact that the *LBK* had been phased out in Europe even before the appearance of the first Neolithic monuments in Britain, suggests otherwise (Whittle 1996).

The behaviour of the Ertebølle groups in southern Scandinavia suggests that hunter-gatherer society not only had a part to play in the changeover to farming, but were complex societies in their own right who were able to resist change if they chose. In north-western and eastern Europe however, there seems to have been some sort of cultural continuity between foragers and farmers which was facilitated through zones of interaction, or a farming frontier, where contact and exchange could take place without loss of social identity (Dennell 1985; Zvelebil 1995b). The existence of such a zone of interaction not only presupposes that indigenous hunter-gatherers played a vital role in the adoption of agriculture, but allows for variation in the take-up of farming by different regional groups. It also dispels the concept that hunter-gatherers adopted farming as a complete Neolithic 'package' (Dennell 1985,136).

However, it is very difficult in a British context, to test Rowley-Conwy and Zvelebil's 'availability' model for the transition to farming (Zvelebil and Rowley-Conwy 1984; 1986; Zvelebil 1995b), as we do not have the kind of 'transition' sites that have been found in the Balkans. An agricultural wave of advance may indeed have started in the Near East, but the mechanisms underpinning the adoption of agriculture changed as the phenomenon spread throughout Europe. Ammerman and Cavalli-Sforza's "ripples on a pool" became disordered and fragmented by the time they reached western Europe and there is no reason to suppose that the same models for explaining 'Neolithisation' should be applicable on both sides of the North Sea. Throughout the Mesolithic period, hunter-gatherer societies had to cope with a constantly changing environment and the large loss of land due to the rise in sea level from the 9th millennium BP would have had a direct effect upon territorial and possibly, social organisation. Initially, the creation of the English Channel may have slowed the rate at which new ideas may have filtered through from the Continent and Britain, may have undergone a certain amount of isolation once the North Sea Basin had been breached (Jacobi 1976). In the past European analogies have been freely used in discussion, often without addressing the fact that Britain had a more varied and diverse topography to that in Europe. The transition to agriculture in Britain, therefore, must have had its own unique features that do not equate with the way the transition occurred in Europe.

At the beginning of the post glacial period, the most important environmental change was the rise in temperature. The increasing warmth had an effect upon the land mass and the distribution of vegetation and animals. The melting ice sheets caused an isostatic rise of the land in northern Britain, when much of land rebounded from the weight of the ice. At the same time the eustatic rise in sea level, which affected all areas of the post glacial coastline, caused the loss of large areas of land and a reduction in hunting territories. Britain was separated from the Continent by around 8000 BP and had become separated from Ireland two to three millennia before that time. The vast hunting area of the North Sea Basin had been lost by about 8700 BP (Bell and Walker 1992) and Britain's new island status created hundreds of miles of new coastal and estuarine environments. There was a transition from an open tundra environment to one of woodland colonisation and as the temperature rose, the cold tolerant species of birch, aspen, willow and juniper had been replaced by an increase in pine and hazel and then the broad-leaved species of oak, lime, elm and alder of the deciduous mixed oak forest by 8000 BP.

Together with changes in vegetation came a post-glacial fauna that was different to that of the late glacial period. Large species such as woolly rhino, mammoth and giant deer became extinct and elk, reindeer and wild horse moved back into the northern Continent. Small herding animals more suitable to a woodland habitat, such as red deer, roe deer, wild pig and aurochs were widespread throughout Britain and smaller mammals increased in number. There was an abundance of marine mammals, such as whales and dolphins, with salt-water fish and shellfish and this together with freshwater fish and wildfowl from lagoons, rivers and lakes offered a rich variety of coastal and wetland resources (Jarman 1972; Sturdy 1975; Jochim 1976).

Climatically, the post-glacial period should be seen as one of instability. Ecosystems were more susceptible to fluctuations, with changes in both the fauna and the local environment. By the Atlantic period, coastlines and river courses were more accessible than many areas inland, due to the density of the woodland. In order to fully understand the Mesolithic lifestyle, account needs to be taken of both the unstable climate and the changing environment within which hunter-gatherers lived, particularly around the time of the Boreal-Atlantic transition (6500 BP onwards) when a rising water table marked the onset of wetter and warmer conditions (Bell and Walker 1992).

There is a paucity of evidence for the transition period (5500 – 5000 BP) in both Britain and Ireland and we have either to rely on European analogies and apply them to the British evidence, or design and test our own theoretical models. There is a truncated Mesolithic settlement pattern in this country: much of the upland evidence has been eroded or ploughed away; many coastal sites are submerged; many sites are buried due to alluviation or colluviation processes. Many lowland Neolithic sites appear to have no antecedents. This might be due to taphonomic processes, but these sites may have been the core areas that were central to Mesolithic communities. It is these antecedent patterns that might suggest continuity, or otherwise, from the Mesolithic to the Neolithic period (M. Zvelebil, pers. comm).

The lack of antecedent patterns on early Neolithic sites suggests that the topographical location for early farmers was critical and that the type of landscapes used by hunter-gatherers may not have been suitable for early farming techniques. If this is the case, we will not expect to find a chronological overlap at either late Mesolithic or early Neolithic sites. In Britain there is no evidence of the kind of 'transition' sites that are found in north western and eastern Europe, where late hunter-gatherers were contemporary with early farming groups, but each keeping their own cultural identity. However, radiocarbon dates show that there is an overlap between some late Mesolithic sites and early Neolithic monuments, such as causewayed enclosures and long barrows. The only evidence of antecedent patterns in Britain are linked to ceremonial sites. Microliths have been found beneath the Neolithic long barrow at Hazleton North, Gloucestershire (Saville 1990), but the stratigraphic evidence is not clear enough to know whether it was local hunter-gatherers who had adopted farming themselves and built the tomb, or whether it was in-comers using a previously cleared site. The Mendip cave evidence suggests that burial focus in caves often continued beyond the Mesolithic period (Taylor 1926;

Wymer 1977), but caves often contain ambiguous evidence from mixed stratigraphic deposits which make it difficult to interpret the chronology. Although, we have many situations that suggest there might have been overlap between the Mesolithic and the Neolithic, we have no 'transition' sites with clear evidence of both microliths and polished stone, or pottery and cereals in secure enough contexts which would suggest a merging of both cultures. It appears, therefore, that the British transition to agriculture occurred in a different way to that in Europe and this thesis seeks to explore those mechanisms by which it might have occurred.

Aims and objectives

For the purposes of this thesis, it was decided to concentrate on the later Mesolithic period in Britain as being a key area to understanding the behaviour of hunter-gatherer society around the time of the transition 5500 – 5000 BP. It is suggested that more would be gained from research and fieldwork into the later Mesolithic period than the Neolithic, as much theoretical study and research has already focused on that period. Much of the earlier research into the Mesolithic period has either concentrated on flint collections, or been derived from a palaeoenvironmental context, with both disciplines often being seen in isolation. Stone tools are more likely to survive on hunter-gatherer sites than other artefacts, but they make up only part of what must have been an extremely organised and complex culture. By regarding artefacts in isolation, because that is all the evidence we have, leads to wrong interpretations in the archaeological record. The evidence of repeated burning, or of pre-elm decline cereal pollen in the palaeoenvironmental record needs to be associated with well-defined archaeological contexts otherwise we are left with isolated incidents that have little relevance to the hunter-gatherer picture as a whole.

Theoretical models have been created for the transition using radiocarbon dating as a tool to suggest overlap between the two periods, but little critical assessment has been put forward of the integrity of the samples used. Because of the lack of data there have not been enough new models put forward for the British transition and it is not justifiable to keep relying on European models that cannot be securely tested on the evidence from this country. In the past, our expectations for the Mesolithic period have been coloured by both the quality and the quantity of evidence that has come from the Continent and in particular Scandinavia, but what we hope to discover and what we actually find, are very different and we must have the resolution to be critical of our own data. We must find new ways of interpreting the evidence that we have, or design new strategies for discovering it.

The retrieval of primary data from late Mesolithic sites was seen, therefore, as crucial to expanding the British database and essential in order to create new models that might explain the transition period in Britain. The county of Somerset was chosen as the main research area for fieldwork and excavation with a concentration in North Somerset. Extensive fieldwalking took place south of the Failand Ridge, 4km from the Birdcombe site and three Mesolithic sites were excavated: Birdcombe, Wraxall (ST475718); Totty Pot, Cheddar (ST482535); Wright's Piece, Mendip (ST528550). The site at Wright's Piece did not produce any flint or evidence of Mesolithic activity and has not been included in this thesis.

Birdcombe produced flint of the quality and quantity that has allowed me to create a model for hunter-gatherer movement within the North Somerset area. The excavation of the area surrounding the Totty Pot swallet hole has shown that hunter-gatherers were using an upland landscape for hunting and burial, rather than for occupation.

A brief assessment of the flint collections held in museum collections in North Somerset was undertaken, with the aim of obtaining a general overview of the type of material that had been previously recovered from fieldwalking, excavation and surface finds. By assessing the flint collections it was possible to confirm the identification of some of the finds as Mesolithic tool typology can often be mis-interpreted and suggest patterns of Mesolithic activity in North Somerset (See Appendix and Chapter 5).

The recovery of primary data from excavation and fieldwork at Birdcombe and Totty Pot has enabled me to propose a model for late hunter-gatherer movement within an upland and lowland landscape in North Somerset. The assessment of the flint collections and earlier fieldwork has allowed me to propose patterns of Mesolithic activity within the county of Somerset. This evidence has been put into a wider context by assessing earlier work from the Mesolithic period in two other counties in the south west peninsula, that of Devon and Cornwall. However, Somerset has been the most intensively studied county in the south west for the later Mesolithic period, with more sites having been excavated and more research projects having been undertaken.

Chapter 2 will outline the environmental and climatic events that occurred at the beginning of the Holocene in north west Europe. To adequately understand

Mesolithic activity it is essential to understand hunter-gatherer response to a constantly changing environment and how large amounts of land loss and alterations to the coastline might have influenced the lifestyle of hunting communities and how this related to their food procurement strategies and raw material supplies. Many of the submerged forests found on the coastline in Somerset have evidence of dry-land activity prior to submergence and their contribution to the Mesolithic database will be assessed. The climatic and environmental events for the late Mesolithic period will be defined for the Somerset Levels and the North Somerset Moors.

Chapter 3 will discuss the current debates for the transition in Europe. These have polarised into a debate between the *demic-diffusionists* based on the 'wave of advance' model put forward by Ammerman and Cavalli-Sforza that agriculture was introduced into Europe by colonists who swept across Europe in a uniform manner and the *indigenists* who argue for farming to have been adopted in a more gradual and variable way by the indigenous population. This Chapter will define the economic and cultural definition of the term 'Neolithisation' and what it might mean for the evidence in Britain. It will also discuss the existence of a farming frontier in Europe, through which technological changes and ideas could be assimilated and whether Zvelebil and Rowley-Conwy's 'availability' model be applied to the British evidence.

Chapter 4 will discuss what is understood by the social complexity of late hunter-gatherer groups in Europe. The increasing weight of evidence from palaeoenvironmental studies provides several implications for the suggestion that indigenous hunter-gatherers in Late Mesolithic Britain would have been familiar with the landscape in which they lived and may have interfered with their environment through deliberate burning to attract game or increase browse for deer; through some sort of plant manipulation or the collection of fodder. This chapter examines the evidence for repeated burning in upland areas such as Dartmoor and the possibility of early cereal cultivation from the evidence of cereal pollen in pre-elm decline contexts and assesses whether it was social complexity that either held up the take-up of farming in the 6th millennium BP or enabled its rapid adoption by the 5th millennium BP.

Chapter 5 assesses the flint collections held by the museums in North Somerset and gives an overview of the evidence for the Mesolithic in Somerset. The coastal area of North Somerset and the upland areas of Mendip dominate hunter-gatherer activity in Somerset, with a paucity of evidence from the low-lying moorland areas. The taphonomic problems of archaeological recovery is discussed.

Chapter 6 will focus upon the primary data collection as a result of fieldwork and excavation that was undertaken at Birdcombe and Totty Pot, two late Mesolithic sites in Somerset. A model is put forward for the movement of hunter-gatherers in the late Mesolithic using both lowland and upland territory in North Somerset. This is based on the evidence recovered from the excavations at Birdcombe and Totty Pot and from the flint collections and earlier excavations that have been carried out in Somerset.

Chapter 7 will discuss the diversity of the database for both the late Mesolithic and the early Neolithic in Britain and the problems associated with using European evidence to model the transition processes in Britain. It will assess the late Mesolithic evidence for the counties of Devon and Cornwall. It will also critically assess the validity of using radiocarbon dates to suggest an overlap for the transition in Britain. The radiocarbon dates for Birdcombe are put into a regional and national context.

Chapter 8 will assess the evidence that has been put forward in this thesis, together with that obtained from fieldwork and excavation and attempt to model the regional transition to farming. It will discuss whether European models can be applied to the British evidence and whether it was *indigenism* or *diffusion*, or a combination of the two, that prompted the adoption of farming in Britain. A model for late Mesolithic activity in the south west of England is put forward.

Radiocarbon dates

The radiocarbon dates in this thesis have been expressed in uncalibrated radiocarbon years 'before present' (BP). For the purposes of comparison with calendar dates from dendrochronology in Chapters 7 and 8, dates have been calibrated using the OxCal Program (Stuiver *et al.* (1998); OxCal v3.4 Bronk Ramsey (2000).

CHAPTER 2

THE CLIMATIC AND ENVIRONMENTAL CONDITIONS OF THE POST GLACIAL PERIOD IN BRITAIN

Introduction

This chapter will briefly outline the climatic conditions of the post glacial period with reference to the influence a constantly changing and unstable environment might have had upon Mesolithic communities. The Mesolithic period covers nearly five millennia, from around 10,000 to 5,500 BP and throughout this period there were changes, not only in the physical landscape, but also in the flora and fauna. To be able to adequately understand the Mesolithic response to this changing environment, it is essential to understand the climatic and environmental conditions that might have influenced hunter-gatherer lifestyle and how this is reflected in tool technology changes and the available resource base, together with food procurement strategies and raw material supplies. With a changing climate and a varying food resource, hunter-gatherers' needs might remain the same, but the conditions under which they obtained their subsistence base and what that subsistence base consisted of, frequently changed throughout the Mesolithic period. Some environments underwent major changes, whilst other areas, such as coastal regions were more marginal, but more vulnerable to environmental fluctuations (Bell and Walker 1992, 108). The ability of Mesolithic communities to constantly adapt to changing conditions throughout the period, is an affirmation of their success as hunter-gatherers and may, in the case of the Ertebølle of southern Scandinavia, be one of the reasons that enabled them to hold out against the take-up of farming for so long.

Climate

During the last glaciation in Britain, around 18,000BP, the ice sheet covered most of Scotland, Ireland, Wales and northern England as well as Scandinavia and northern Europe. By the late glacial period, around 13,000BP there was a significant rise in temperature, which caused the sea level of the Atlantic Basin to rise over 100m. By 12,500BP warmer waters were found around western Europe which brought a Continental climate with summer temperatures around 17°C, and winters between 0-1°C. This lasted for approximately two thousand years. By 11-10,000BP the dispersed woodland that was beginning to develop, was replaced by scrub tundra with the Loch Lomond Readvance. This was the last time glaciers were in Britain when the Polar Front reached its maximum off the south west coast of Ireland. A large area of ice formed in the western highlands of Scotland, with smaller glaciers further south (Bell and Walker 1992).

As surface waters warmed with an increase in temperature in the early Holocene, around 10,000BP, the ice sheets receded and released a vast amount of melt-water which caused a eustatic rise in sea level, but it also unlocked vast areas of land that had not been previously been inhabited. The removal of the weight of the ice-sheet caused an isostatic rise of the land in some areas and this can be seen in the raised beaches in the north of Scotland, Northern Ireland and Scandinavia. The tilting of the land in the north of England caused a depression in the south and many coastlines became submerged. The rise in sea level was a global event, but isostatic land movement varied. The rate of absolute sea level change has been difficult to establish, but it has been estimated that in the North Sea area, the Dogger Bank was submerged by around 8700 BP and the Straits of Dover were breached by 8000 BP. By 7800 – 7500 BP the present coastline of the southern North Sea basin was established and from about 6500BP, marine inundation slowed down (Bell and Walker 1992, 93). This meant the loss of a large hunting territory and the artefacts from the late glacial period that have been recovered in dredging nets from this area, suggests that the land that has now been lost beneath the North Sea was extensively used by hunter-gatherers prior to inundation (Wymer 1991).

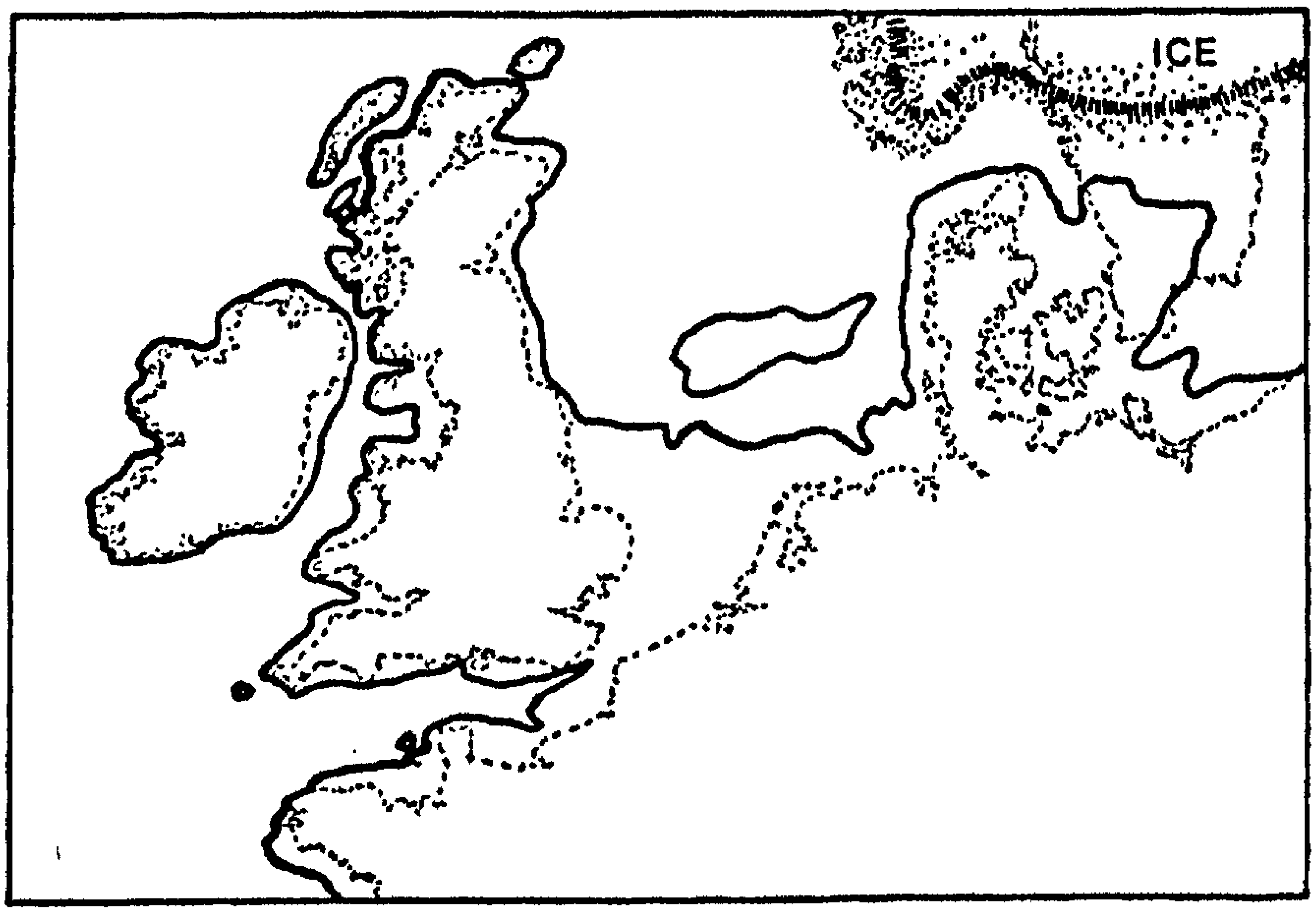


Fig. 1 North West Europe at the beginning of the Mesolithic period 10,000 BP when Britain was joined to the Continent. (Wymer 1991)

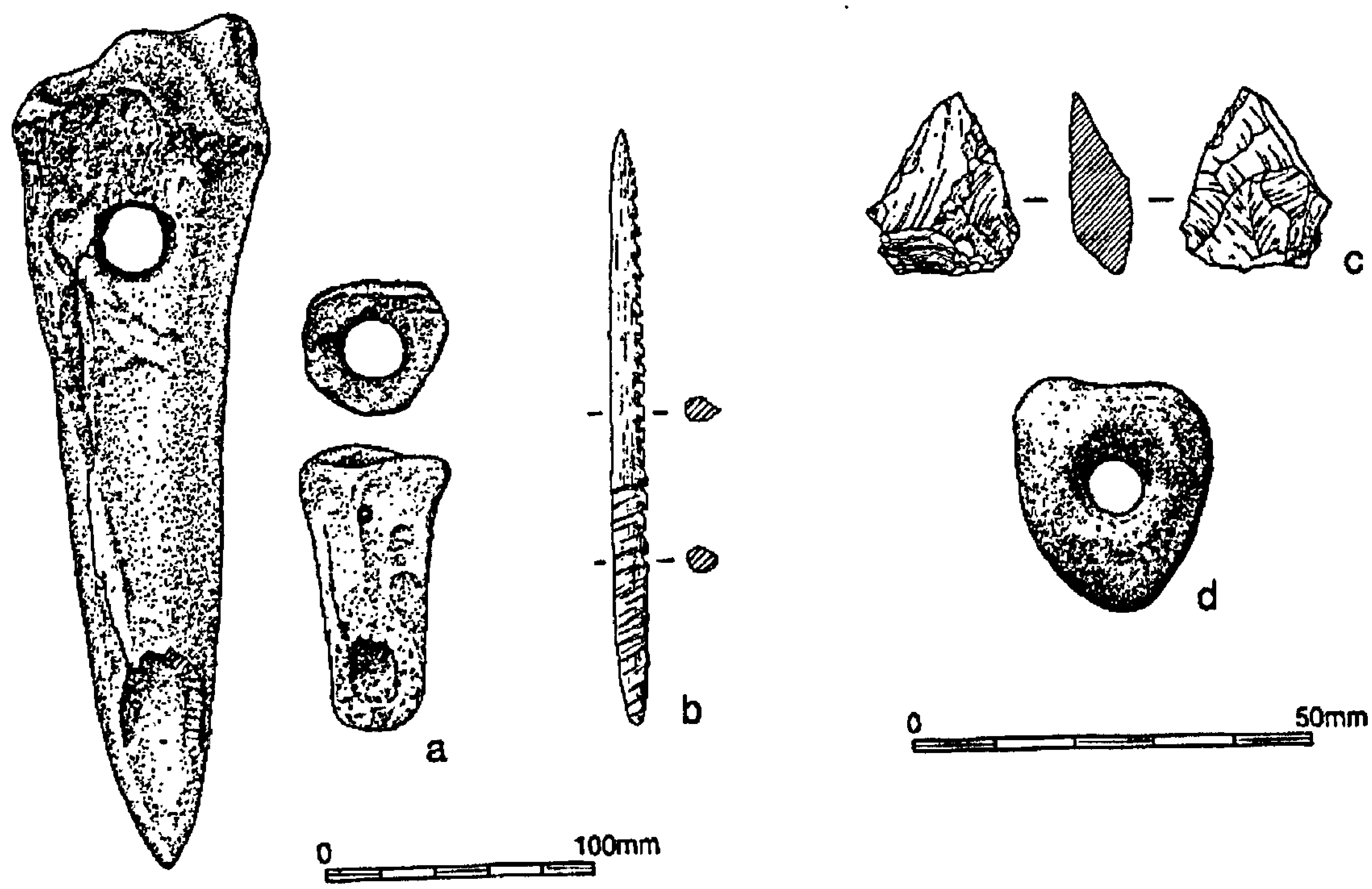


Fig. 2 Post glacial artefacts from the North Sea Basin. a) Worked bone and antler from Brown Bank. b) Antler point from Leman and Ower. c) Flint from Viking-Bergen. d) Drill stone from Store Fiskebank (Coles 1998)

The early Climatic Optimum, or Pre-Boreal period, around 10,000-8000BP, saw a reduction in the water table. This meant that precipitation decreased, alluviation ceased and streams became single-thread meandering channels. The effects of climatic warming reached its maximum (the Climatic Optimum) between 8000 and 4500 BP and temperatures were higher than today by 1-2 °C, as seen by the distribution of holly, ivy and mistletoe and the pond tortoise, which is only found in the Mediterranean and Eastern Europe today (Bell and Walker 1991).

The wetter Atlantic period, from around 6500 BP, is recognised in pollen records by a rise in wetland taxa and the growth of ombrogenous blanket peat (Bell and Walker 1992). By around 5000 BP (the time of the transition) there was a fluctuation in conditions with a deterioration in climate which progressively worsened between 3000 – 2500 BP, with a shift to cooler and wetter conditions with temperatures falling between 1 and 2 °C (Bell and Walker 1992, 72).

The rise in sea level that created new coastal and estuarine areas around Britain is vital to understanding patterns of settlement and use by Mesolithic communities. It is these areas that have concentrations of late Mesolithic sites, both in Britain, Ireland and Scandinavia, but this type of environment is extremely vulnerable to change, which can affect the subsistence base, as well as settlement habitat. The initial rise in Holocene sea level not only forced early Mesolithic groups to find new territories, but caused constant adaptations to be made in the light of changing topography.

The Severn Estuary

The Severn Estuary in south west Britain is an area which was greatly affected by the rise in sea level. On the Welsh side, in the early Holocene thick clay deposits formed (the Wentlooge Formation). Marine transgressions can be seen in the formation of peat bands between 4000BP and 2500BP (Bell and Walker 1992). Human footprints from the Mesolithic period have been found in these clays beneath the peat on the foreshore at Uskmouth, Gwent, dated to 6140 ± 100 BP (5270 – 4830 Cal.BC) (Oxa-3307) (Aldhouse-Green *et al* 1992), together with footprints of wild animals, suggesting the range of faunal resources available (Fig.3).

The Somerset Levels

On the English side of the Severn Estuary a coastal barrier of sand dunes existed in the Mesolithic period that formed the western edge of the Somerset Levels (Fig.4). Inland estuarine clays were formed by constant inundation of the coastal lowland around the time of the transition (5500 – 5000 BP). Alternating peat-clay sequences were laid down due to several phases of marine inundation and at the end of the Mesolithic period the Somerset Levels were colonised by *Phragmites* reeds when peat accumulated and fen woodland developed (Bell and Walker 1992).

The Somerset Levels is an area that has been used throughout the Mesolithic period, with flint from the early Mesolithic being found on the slightly raised sand islands called Burtle Beds, south of the Poldens at Greylake (Middlezoy) and at Shapwick, north of the Poldens (Clark 1933; Wainwright 1960). Burtle Beds occur on the Levels, both north and south of the Poldens. They are low mounds of sand and gravel which rise a few metres above the alluvial surface. The Burtle Beds contain marine, fresh-water and land shells, as well as remains of Pleistocene and Holocene fauna (Whittaker and Green 1983). Although the origin of the Burtle Beds remains unclear (Whittaker and Green, 1983, 81), these low mounds could give refuge and shelter above the swampy ground surface for hunting groups in the early Mesolithic.

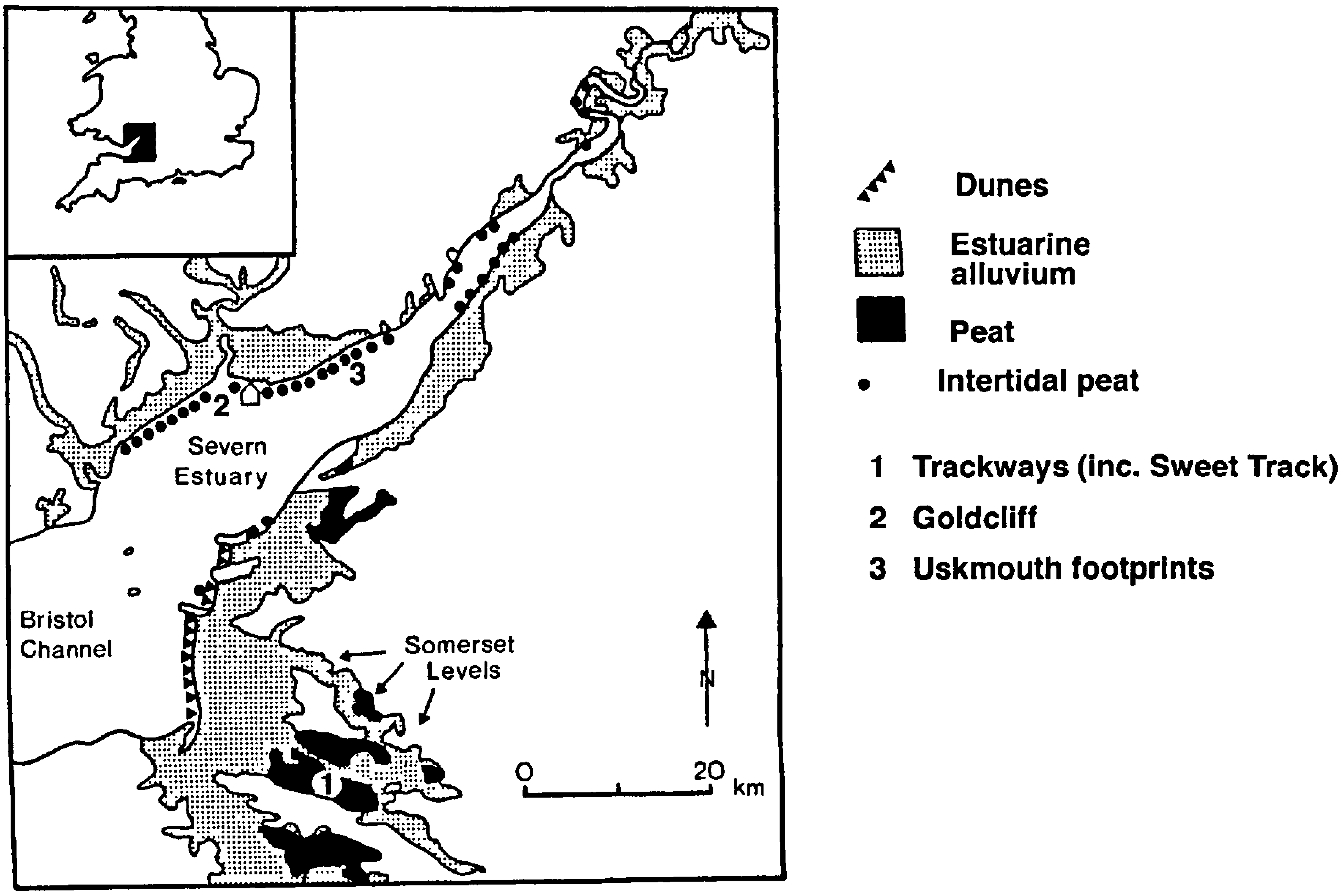


Fig. 3 The Severn Estuary (after Bell & Walker 1992)

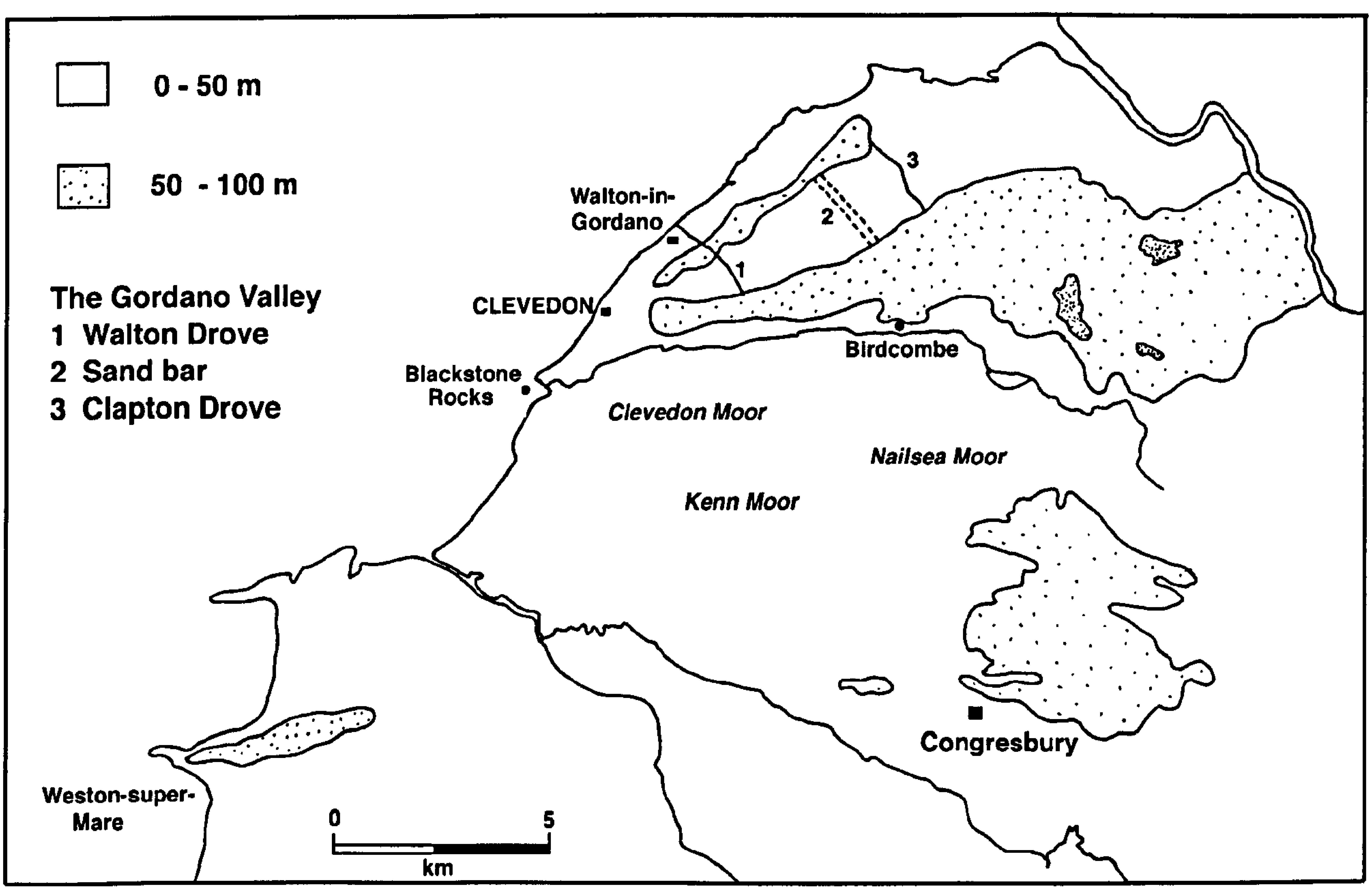


Fig. 4 The Gordano Valley and the North Somerset Moors

The Sweet Track (discussed in Chapter 8) was constructed from the raised ground of the Shapwick Burtle to the lias island of Westhay in response to wetter conditions around the time of the transition.

Submerged forests

There are many Mesolithic sites around the coasts of England today that were not coastal in the early Mesolithic period. The site at Blackstone Rocks, Clevedon, Somerset, is only accessible at low tide today, but in the early Mesolithic period would have been some distance from the coast. In Cornwall, at Constantine Bay, the Mesolithic sites at Trevose Head would have lost a great deal of their economic hinterland through rising sea levels (Johnson and David 1982). Submerged forests were formed when coastal woodlands became flooded by the post glacial rise in sea level. They are often visible at low tide, as stumps still in position, or fallen trunks in the intertidal area, where in some cases flint has also been recovered, for example at Porlock Weir and Minehead, Devon (Wymer 1977).

The stumps of the submerged forests often have associated peats, which can provide complementary palaeoenvironmental information as well as radiocarbon dates. Mesolithic flint has been found below the submerged forest at Porlock, where peat bands are dated to between 8300 – 5500 Cal.BC (Bell 2000). Most of the submerged forests have been preserved by being buried by later growths of peats, or by being covered by marine sands and silts. Some of the forests are very well preserved and visible at low tide, such as that at Borth, Cardigan Bay, Wales, whilst some are rarely exposed, being covered by sand and shingle and may only be seen after a storm. The dominant species is oak, although at some sites pine is the major species (Heyworth 1978). They have an age range from about 8000 – 1000 BP.

In the northern hemisphere oak is the best species for dating by dendrochronology and many of the trees from the submerged forests have been dated by this method. The submerged forest at Borth, Cardigan Bay, Wales has a date of 5300 BP and the most common age of the forests throughout Britain and Northern Ireland is between 5500 and 4000 BP, which places them around the time of the Mesolithic-Neolithic transition, when there was moderate sea level rise which eventually submerged them. It is from these critical, wetland areas that the vital archaeological information that is normally lost on dryland sites is provided. One of the most important areas of future research for Mesolithic study has to be from the submerged forests that are found around Britain's coastline.

Dendrochronology has the potential, from the variation in ring-width pattern, to provide a more precise chronology for the rate at which the sea level rose during this period, than that which can be achieved from radiocarbon dating. This has implications for the reconstruction of palaeoclimates in order to enhance our understanding of the formation processes and taphonomic factors that are applicable to coastal environments. Dendrochronology has the potential to establish

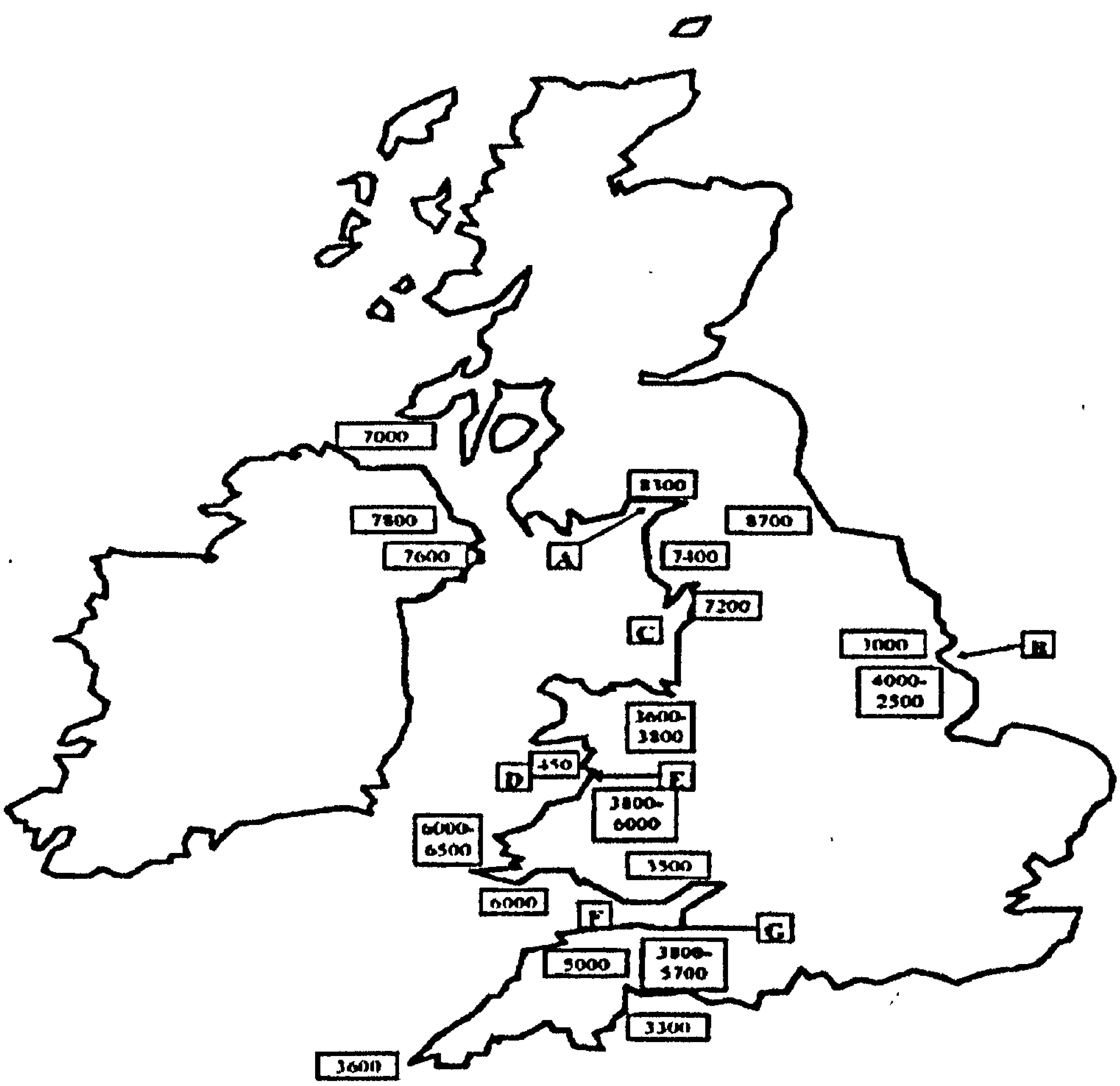


Fig. 5 Map showing the radiocarbon ages of some of the submerged forests around the coast of Britain. A: Solway Firth; B: Humber; C: Morcambe Bay; D: Cardigan Bay; E: Borth/Ynlas; F: Bristol Channel; G: Stolford. (Clapham 1999)

chronological relationships between the submerged forests and any archaeological evidence and because as a dating method it is so precise, it can provide a timescale for environmental change and the human response to that change (Bell 1997).

Previous dendrochronological work in the south west has been at Stolford, Bridgwater Bay, Somerset where wood from the submerged forest contributed to the tree-ring chronology that dated the Sweet Track (Hillam *et al.* 1990). The Sweet Track was constructed at a time when the Somerset Levels were flooded and when coastal forests were becoming submerged. Laboratories in Belfast and Germany experienced difficulties in constructing a chronology at around this time, due to the absence of bog oaks and Baillie suggests that this might be due to some sort of environmental pressure (Baillie 1995, 147). The coastal zone was highly valuable to Mesolithic hunter-gatherers and it is increasingly clear that palaeoenvironmental studies together with dendrochronological dating, can make a vital contribution to the understanding of human behaviour in the intertidal zone.

The North Somerset Moors

The palaeoenvironment is well documented from the Somerset Levels between the Mendip Hills and the Polden Hills, together with the moors of Sedgemoor south of the Poldens (Somerset Levels Papers 1975-88). In North Somerset, however, between Mendip and the Failand Ridge little research has taken place Fig.4). Gilbertson and Hawkins' report (1983) of a wooden stake recovered from Kenn Moor (NGR: ST437694) includes details of the alluvial stratigraphy of the area. From extensive coring and trenching on Kenn Moor, they suggest that the present village of Kenn (NGR ST416690) is situated on a low hill of sands and gravels formed of Pleistocene glacial, marine and freshwater deposits of 6.5m which overlay Mercia Mudstone. This low island is similar to the Sand Burtles in the Somerset Levels and would have been a good base for prehistoric groups when exploiting the marshland resources around the time of the Late Neolithic or early Bronze Age.

Further work by Butler (1987) in the Kenn Moor area suggests that in the Mesolithic period, prior to the Atlantic, there was marine lagoonal salt marsh and mud flat, which later became fluvio-lagoonal. Occasional tidal flooding continued into the Atlantic period and by the Neolithic, 5000BP, there is perimarine swamp forest with alder carr reedswamp and small lakes.

Jefferies *et al.* (1968) document the history of the Gordano Valley in the late glacial and post glacial periods. The valley runs for 7km in a north-east/south-west direction north of the Failand Ridge. It is 1.5km wide and is bordered in the north west by the Bristol Channel (NGR ST440735) (Fig.4). From coring in the valley the presence of a sand bar has been established across its width. The sand bar is composed of the type of material that makes up beach and dune sands, but Jefferies *et al.* (1968) are unable to say when it was formed. They suggest that the bar had an effect upon peat formation at the head of the valley in the late glacial and post glacial periods by impeding drainage from the south west end of the valley. By the Atlantic period, with increasing precipitation and rise in the water table, fen oak woodland gave way to reed swamp. Flooding and the formation of peat was a short phase which then gave way to an abundance of oak and alder. At the end of the Atlantic period there were minor sea incursions, but the increase in tree pollen suggests a drier land surface. Jefferies *et al.* (1968) show that the sequence of the Gordano Valley with its fen woodland species and lack of raised bog, is quite different to that of the Somerset Levels. The topographical location of the valley is unusual and its isolation may have had an effect upon the palaeoecological processes (Jefferies *et al.* 1968).

Gilbertson and Hawkins (1990) have also undertaken work in the south western end of the Gordano Valley, at Walton-in-Gordano. At the start of the Holocene there was a freshwater lake basin surrounded by rich vegetation which had infilled with vegetation by around 5260 ± 120BP (SRR-3201) when fen and carr environments had formed and pine and birch had been replaced by mixed oak forest. There were two distinct phases of decline in oak and elm at 5250 and 5050BP, which was not attributable to anthropogenic activity. From around 3820 ± 100BP (SRR-3199) there is evidence of wetland conditions with fen and carr environments. There are complex Holocene peat and clay horizons which may be associated with both estuarine and freshwater conditions, but the "thin" peats interleaved within the sequence, may have resulted from saltmarsh conditions (Gilbertson *et al.* 1990).

Overall, the above palaeoenvironment studies for the Gordano Valley and Kenn Moor area shows that there are changes in the local environment at the end of the Mesolithic period, particularly around the time of the transition, when the plant evidence suggests that there was an initial decrease in freshwater aquatics, but a later rise in water table with wetland taxa such as *Typha* occurring by the Sub-Boreal period and my the middle of the 4th millennium BP saltmarsh had returned to the Kenn Moor area and this will have some relevance for palaeoenvironmental reconstruction at Birdcombe (see Chapter 6).

Forest development

The retreat of the ice-sheets and the rise in temperature allowed the rapid growth of forest during the post glacial period in north west Europe. The tundra and steppe was replaced by a succession of different types of trees that depended upon certain soil conditions and increasing warmth. In north west Europe cold loving species such

TABLE 1

Climate and Vegetation Changes in North West Europe

PERIOD I: **Pre-Boreal 10,250 – 8950 BP**	Britain joined to the Continent July temperatures rising from 8 °C – 12 °C Willow, birch and pine Reindeer
PERIOD II: **Boreal 8750 – 7000 BP**	Britain separating from the Continent Temperatures rising to their maximum of 17 °C Dry Continental climate Birch and/or pine dominate Alder, elm, oak and lime (mixed-oak forest) appearing Expansion of hazel at the end of the period Reindeer survives, elk common but predominantly forest species including deer
PERIOD III: **Atlantic 7000 – 4450 BP**	Britain separated from the Continent A wetter, more oceanic climate July 17 °C Birch and pine replaced by alder and mixed-oak forest. Reindeer absent and elk is rare

(After Clark 1936)

as birch, aspen, willow and juniper dominated the landscape. Pine and hazel increased as the temperature rose and warm-tolerant broad-leaved trees, such as oak, lime and elm, together with alder, formed the predominantly mixed oak forest of the Boreal period. Clark's three phases of vegetational development is still applicable and has been used throughout this thesis (Clark 1936) (Table 1).

The high temperatures which began in the Boreal period, continued into the Atlantic in Britain, when a period of stable climatic conditions allowed trees to expand and reach their limit, with their distributions being determined by natural events. Alder increased throughout Britain in response to the wetter conditions and in some places became the dominant species. Lime became very common in England, except in the north and hazel and birch decreased to a certain extent, which was probably due to the closed canopy. Elm retained a steady state, with an increase in holly and ash during this period. There are regional differences, however, with deciduous oak

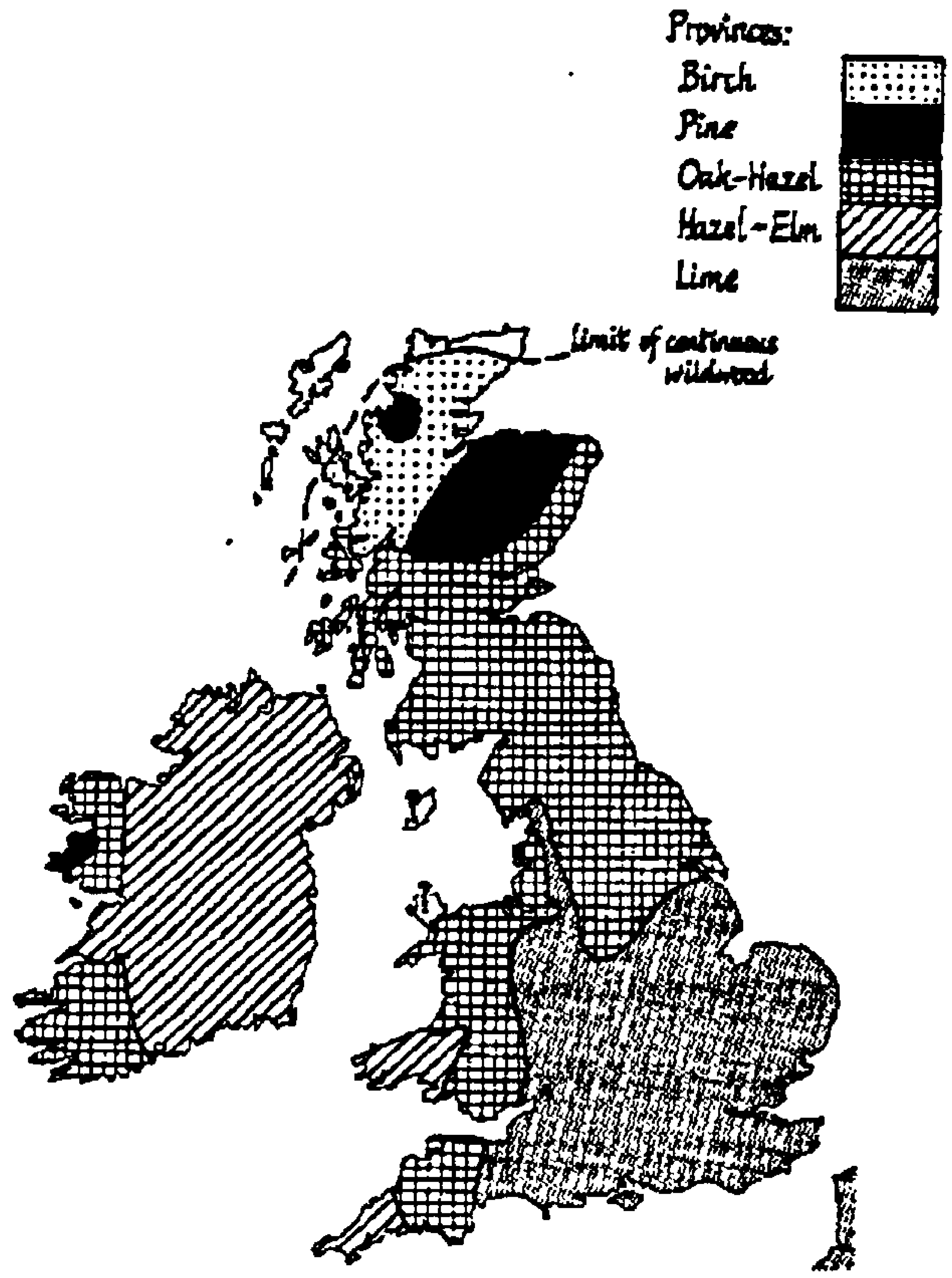


Fig. 6 Woodland provinces in Britain in 4500 BC (Rackham 1986, 71)

woodland, lime and elm together with hazel, alder and some ash dominating England and Wales, whilst in Scotland the climax vegetation was pine-birch forest, with oak, elm, hazel and alder being found in the west (Clapham 1999). These woodlands survived until the Neolithic period when clearance had an increasing effect on both the survival of species and the growth of bog and heathland. The elm decline marks the end of the Atlantic period and is discussed more fully in Chapter 4.

Post glacial fauna

Together with vegetation changes in the post glacial period, also came a change in fauna. The large mammal species, such as woolly rhino, mammoth and giant deer became extinct and reindeer and elk moved back into northern areas (Sturdy 1975) as did the arctic fox and arctic hare. Herding animals such as reindeer and wild horse that had used the open tundra, were replaced with the small herding animals of red deer, roe deer, wild pig and aurochs. Red deer in Britain in the Mesolithic period were larger than today, as were roe deer and wild pig (Jochim 1976). Red deer inhabit a variety of habitats from open grasslands to closed forests. During the Atlantic period when forests became more closed, this habitat was not ideal for the red deer. Roe deer prefer mixed woodland with underbrush and clearings for browse, but can cope with open areas. The spread of the mixed-oak forest would have favoured roe deer, but not the gradual closing of the forest. Roe deer would have been in competition with red deer and boar for hazel nuts and browse in winter and would consequently suffer as a result, as they did with predators such as the wolf (Jochim 1976; Jarman 1972). Wild boar are associated with a closed forest habitat, but they prefer mixed deciduous woodlands as the major foods are acorns, hazelnuts and beech nuts, as well as roots, herbs, grasses and small mammals and the Atlantic forest would have been extremely favourable to wild boar (Jochim 1976).

The rising sea level and the expansion of coastal and estuarine locations made available a wide range of fish and sea mammals, together with sea birds and wildfowl and marine resources became extremely important in the later Mesolithic period.

The fauna of the Mesolithic period saw many changes due to the effects of both climate and vegetation as well as by human activities. Aurochs became extinct in Europe in the 17th Century (Legge and Rowley-Conwy 1988), but its preferred habitat was both open grassland and woodland (Jochim 1976). In Denmark the aurochs was numerous in the Boreal period, but rare during the Atlantic (Jochim 1976). However, in the south west of England there is a radiocarbon date for the survival of aurochs on Mendip to the Bronze Age of 3570 ± 110 BP (BM-731) (Burleigh and Clutton-Brock 1977). In Ireland there is a paucity of red deer in the Mesolithic period, with wild pig being the dominant mammal (Woodman 2000).

With the Mesolithic period came bow and arrow technology (discussed in Chapter 7) as the loss of the tundra landscape and the colonisation of dense woodland over much of Britain required a change in hunting techniques. The use of the bow and arrow, tipped with a microlith became widespread in the Mesolithic period, as the small herding animals such as deer required individual stalking within dense woodland (Rozoy 1989).

Discussion

The instability of a changing climate and environment which spanned almost five thousand years had a direct effect upon the lifestyle of hunter-gatherer societies. The long term changes in the environment needed an adaptable society to respond successfully both to changes in the physical landscape as well as the climate. The changes in tool technology that can be seen at the end of the Upper Palaeolithic period, from a spear-throwing hunting kit that was suitable for large migrating herds of reindeer, to the smaller 'broad blade' and ultimately the minute, geometric shapes of the 'narrow blade' industries of the Mesolithic, must be seen as a direct response to the resources that were available in a densely wooded environment. The colonisation of woodland at the beginning of the post glacial period would have made surface raw material more difficult to obtain and also inland access and communication routes would have been restricted by the local environment. The subsistence base would, therefore, be constantly altering as hunter-gatherers adapted and changed their food procurement strategies.

The changes in the physical landscape throughout the Mesolithic period would have initially unlocked large areas of land that had been covered by the ice-sheets and made them accessible, but ultimately the loss of land through sea-level rise would have been greater. The rapid rise in sea level at the beginning of the Holocene would have had a noticeable effect within just over a generation in terms of timescale, where people could have remembered the loss of land. We do not know what kind of cognitive effect this would have had on people living in an area where they could see their hunting territory diminish as the sea level rose. Technologically, the effect of Britain and Ireland becoming isolated from the Continent can be seen in the different way tools developed and no evidence of the trapezoids that are common in Europe at this time, have been found in Britain (Jacobi 1976). Although it is likely that communication with Europe continued, we do not have the archaeological evidence for it until the end of the Mesolithic and the transition to farming.

Around the time of the transition an environment change is suggested in the tree-ring chronologies from both the Belfast and the German laboratories. Baillie's work in building a chronology for the English Neolithic around the time of the transition experienced difficulties in finding bog oaks to cross the period 4023 – 3916 BC (calendar years) and Baillie suggests that there was a depletion of oaks around this time. However, oaks were found, not from the peat, but from an archaeological site (the Sweet Track), from river gravels and from a submerged context (Hillam *et al.* 1990). Using available radiocarbon dates for the British and Irish Mesolithic and Neolithic, Baillie models the start of the British Neolithic at 5200 BP (Baillie 1995, 146), which appears to be synchronous with the elm decline, the accurate radiocarbon dates for the English bog oak 'gap' and the Sweet Track.

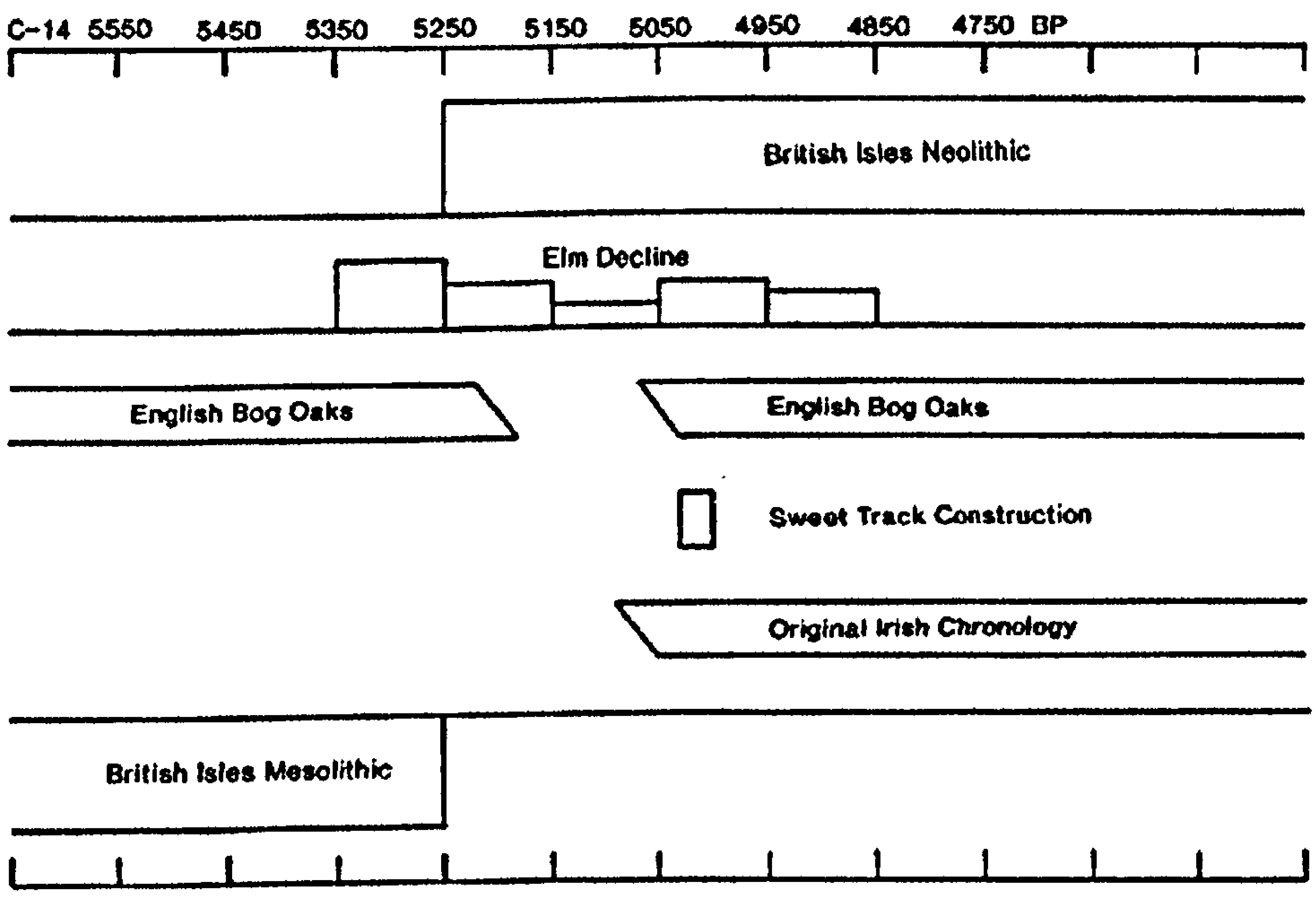


Fig. 7 The gap in the dates of the tree-rings (plotted in radiocarbon years) suggests there may have been an environmental event around the start of the Neolithic (Baillie 1995, 147)

Using Fig.4 Baillie suggests that there was an environmental event around the time of the transition and questions whether the transition to agriculture occurred as a direct result of that environmental pressure. The construction of the two German chronologies also experienced problems around 4000 BC (calendar years) (Baillie 1995, 147). If this is the case, it suggests that an environmental event was widespread in north west Europe, which may have had a far-reaching effect in causing a change in society, not only in Britain, but also in Europe.

It appears that throughout the Mesolithic period hunter-gatherers were able to successfully adapt and control the environment in which they lived, even in the face of rising sea level and land loss. It is interesting, therefore, if we accept Baillie's widespread environmental pressure at around the time of the transition, that hunter-gatherers felt that they could not continue their lifestyle, even though they had done so for five millennia, but were compelled to adopt a different subsistence base and a new social organisation. Was it the environmental pressure alone that was too great for them to continue a hunting lifestyle, or was there was something more attractive in a new ideology and social order that necessitated such a completely different culture? Although dendrochronology can suggest with reasonable authority that there may have been an environmental hiatus around the time of the transition, other reasons must be looked for to explain why farming was taken up at this time. The changes made by the Ertebølle of southern Scandinavia, when they eventually took up farming, shows how a successful hunter-gatherer group, who resisted farming for a thousand years, were eventually forced to change their subsistence base (Rowley-Conwy 1983). This may have been due in part to the environmental changes, causing the lack of salinity in the sea which affected the oyster, but there may have been other, social reasons that we cannot see in the archaeological record.

The Ertebølle, like the Mesolithic in Britain, appear to have been successful hunter-gatherers for a considerable period of time, even resisting farming when it was known to them (in the case of the Ertebølle). This suggests that there was either something more than a new economy that was attractive to hunter-gatherer groups, or that the environmental pressure and perhaps a diminution of resources around the time of the transition, was just the final push towards a much needed change in social organisation.

CHAPTER 3

THE TRANSITION TO AGRICULTURE
The Current Debates

Introduction

This chapter will examine the debates that surround the transition to agriculture, both in a European and a British context. It will examine the views put forward by those researchers who propose that the introduction of agriculture was brought by immigrants or colonists moving across Europe, as well as the opposing view, that the indigenous population might also have had a role to play in the transition. Discussion will focus upon the evidence found in Europe and whether it can be applied to a British context.

The evidence for the 'neolithisation' process will be examined and how it has been defined with regard to the evidence in Europe from the 7th millennium BP. The European framework within which neolithisation took place, includes the existence of a 'farming frontier' which acted as a filter through which technological changes and ideas could be exchanged between indigenous hunter-gatherers and early farming groups, as a precursor to the eventual take-up of farming on a more permanent scale. The evidence for the existence of such a frontier will be examined in the light of the evidence from Britain and Ireland and discussion will focus on whether European models can be tested on the British evidence.

Background

Childe's concept of the new economy of agriculture being "brought by actual immigrant shepherds and cultivators" who did not mingle with the indigenous population, defined the Neolithic purely in terms of economy and in particular, food production (Childe 1957). Piggott also assumed that farmers had migrated to Britain from western Europe (Piggott 1954). Since Childe's publication in 1957 of the *Dawn of European Civilisation* the mechanisms by which predominantly, mobile Mesolithic hunter-gatherer societies adopted a Neolithic economy, based on cereal production and animal husbandry, has been intensely debated. Established within the transition controversy has been the issue of the rate of the spread of farming across Europe.

The arguments have become polarised into a debate between *diffusionists* and *indigenists*. Side by side with the archaeological issue, the debate has been influenced by anthropologists and linguists to raise the political questions of the cultural identity and the genetic and linguistic roots of present-day Europeans (Zvelebil 1995b). The diffusionist view of colonising farmers from the Near East, replacing the indigenous population of hunter-gatherers has been widely adopted (Ammerman and Cavalli-Sforza 1984; Sokal *et al.* 1991) and attributed to the use of Indo-European languages in Europe (Renfrew 1992). Ammerman and Cavalli-Sforza (1971; 1984) supported the *diffusionist* view by putting forward their model of *demic-diffusion.* They attempted to measure the rate farming spread across Europe from the Near East by using radiocarbon dates and suggested it occurred in a uniform manner known as the 'wave of advance'.

Opposed to the diffusionist theory are those who argue for farming to have been adopted more gradually by late Mesolithic communities is the *indigenist* view held by Dennell (1985), Scarre (1983), Rowley-Conwy (1983) Dolukanov (1986), Thomas (1991; 1999), Whittle (1996) Zvelebil (1986;1995b), Armit and Finlayson (1992), Armit (1996) and Woodman (2000). They argue for a more complex later Mesolithic who may have had some role to play in the adoption of farming, although Zvelebil emphasises that "the one does not exclude the other" (Zvelebil 1995b) and although Zvelebil strongly argues for local adoption of farming in Europe through contact and exchange, he also suggests there might have been regional migration between hunter-gatherers and farmers on a small scale (1995b,107).

Palaeoenvironmental studies by Caseldine and Hatton (1993), Edwards (1989a; 1989b; 1993) and Simmons (1979; 1993; 1996) give some support to the *indigenist* debate and suggest that some form of woodland management or manipulation of the environment was taking place in the Mesolithic period. The issues raised by the idea that interference of the environment by hunter-gatherers constitutes some form of social complexity is more fully discussed in Chapter 4.

The traditional view of the introduction of agriculture into Europe and Britain has been for colonising Neolithic farmers to spread across Europe, in what Ammerman and Cavalli-Sforza have described as a 'wave of advance', either displacing the indigenous hunter-gatherers or assimilating them into a new Neolithic culture. The concept of a complete Neolithic 'package' being adopted in its entirety was also given some weight. This model produces an image of colonising farmers complete with polished stone tools, pottery, domesticated cereals and animals who immediately erected villages and monuments into the landscape. The concept of a 'Neolithic Revolution' (Childe 1936) has done little to advance any role the preceding Mesolithic communities might have played in the changeover to farming.

The term Mesolithic has a deep-rooted history having been conceived in the nineteenth century to bridge the gap between the Palaeolithic and Neolithic. The view then was that there had not been any human occupation in Britain until well after the last glaciation, which began around 13,000 BP (Bell and Walker 1992) until the first farmers arrived between 5500 and 5000 BP. The Mesolithic period was seen as an underdog period, with native populations scratching a living from an under-resourced environment. Although this view was reversed with Grahame Clark's discoveries at Star Carr (Clark 1954), prejudices have still survived and researchers into the transition period have perpetuated the division between the Mesolithic and Neolithic, assuming that the social and economic practices of hunter-gatherers and early farmers were incompatible. Mesolithic research has focused primarily on hunter-gatherer economy, whilst the Neolithic has been seen as a completely new starting point without a Mesolithic. A clear division was seen between hunter-gatherers and farmers, with hunters being viewed as an inferior social group, transient and living at subsistence level compared with the more superior permanent settlement, cleared woodland and field systems that came with farming. The start of the Mesolithic has been defined by a climatic change, but ending with a social and economic adaptation by the time farming was adopted. Emphasis has also been placed upon environmental determinism and the Mesolithic focus has been based on ethnographic evidence and subsistence strategies with the Neolithic being viewed in terms of an ideology and social organisation. This continuing divide has resulted in the assumption that "society and economy change in unison" (Armit 1996).

The Wave of Advance

Ammerman and Cavalli-Sforza's model of *'demic-diffusion'* (1973, 344) claimed that the spread of farming resulted from population growth and displacement. The 'wave of advance' modelled the spread of farming by colonists across Europe from the Near East. It was seen as a "slow, continuous expansion" of farming groups bringing domesticated grain and animals, together with pottery moving westwards across Europe from the Near East. Ammerman and Cavalli-Sforza (1973, 353) believed that this expansion could be measured using radiocarbon dates, although in later analyses, they admit to some regional variations. The movement of farming was driven onwards by temporary soil exhaustion or overcrowding and was calculated at being around one kilometre per year (Thorpe 1999). Although they recognise that initially farming preceded the appearance of pottery, they suggest that pottery had to be associated with farming once it began to spread (1971, 674). The model is based on the existence of a 'farming frontier' at the head of the colonists who advanced across Europe.

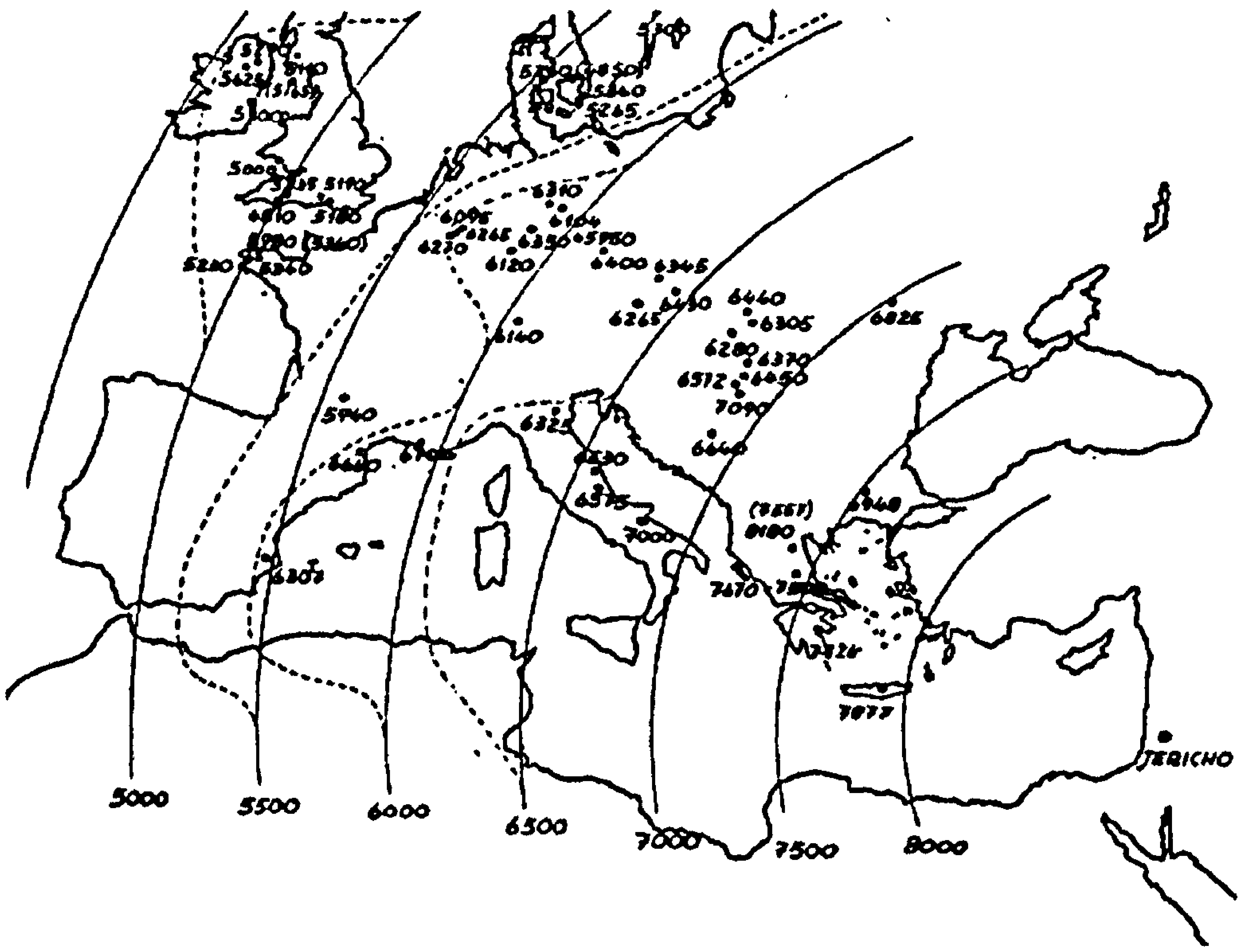


Fig. 8 Map showing the spread of early farming in Europe. Dates are shown in years BP; arcs indicate the expected position of the spread at 500 year intervals; broken lines take into account regional variation. (Ammerman and Cavalli-Sforza 1971)

Zvelebil has fiercely criticised the 'wave of advance' model stating that Ammerman and Cavalli-Sforza have confused the understanding of the Neolithic in different regions of Europe and that their measured rate of spread of farming has been too swift around the Mediterranean regions and too slow in the east and north of Europe, where hunter-gatherers continued their lifestyle in some areas until the third and even the second millennium BP. Zvelebil also pointed out that Ammerman and Cavalli-Sforza had taken no account of any regional variations or transportation by sea and that the model does not give any explanations for the adoption of farming. He suggests that they have confused the issue by using sites that have no positive evidence of cereals with others that are predominantly hunting sites with some pottery (Zvelebil 1986). Recent geneticists have also misused the archaeological data to claim the ethnicity of modern European populations (Zvelebil,1995b,107). Despite these short-comings the model has been taken up by Renfrew to support the movement of Indo-European languages across Europe that came with a Neolithic economy (Zvelebil 1995b). Renfrew proposes that farming groups spread from eastern Anatolia, bringing their language with them. Renfrew does take into consideration that there might have been resistance by hunter-gatherers in some areas and also that there was some regional variation (Thorpe 1999).

Van Andel and Runnels (1995) accept the 'wave of advance' model in principle, but suggest that the wave front disintegrates and loses its uniformity as it travels across Europe. They modify it by suggesting that it was not population pressure that caused the advance, but a preference for a particular type of environment and that people might have moved because of a preferred landscape rather than population pressure and that Neolithic sites were chosen for their soil type, for example, river floodplains such as are found in Thessaly, Greece, the Hungarian floodplain landscape of the Körös and the Tavoliere in Italy. They suggest that the *Linearbandkeramik (LBK)*, who preferred *loess* soils, occupied a more dispersed kind of settlement rather than in villages in the early phases of farming. From their studies in Greece, van Andel and Runnels (1995) are able to show that the Neolithic settled in areas not previously occupied by indigenous Mesolithic. This may have been the case in the initial stages of farming in Greece and other Mediterranean areas, but by the middle of the sixth millennium BP when farmers came into contact with the indigenous populations of eastern Europe and the north European plain, Zvelebil (1986; 1995b) can show that there is an extended delay in the initial take-up of farming, which was then rapidly followed by a shift in economy. He states that in the western Baltic the adoption of farming took only two hundred years, but in the eastern Baltic it took as long as two millennia, which brought it into the Bronze Age.

Although the 'wave of advance' model was used to plot radiocarbon dates for Neolithic settlement across Europe, Dennell (1985) points out that it does not take into account any transport by sea, or suggest any mechanism by which farming was adopted and it is not always clear whether it is the spread of pottery or the spread of agriculture that is being measured. Many of Dennell's propositions are based on ethnographic and modem day historical evidence with little archaeological evidence to support them and we should be wary of trying to fit too precisely current hunter-gatherer behaviour on to prehistoric cultures.

It has taken a long time to throw off the idea of immigrating farmers moving across Europe and although the *diffusionist* theory still carries some weight, more recent studies have contributed towards building an opposing view. The *indigenists* have suggested that hunter-gatherers at the end of the Mesolithic period might be highly complex groups, capable of manipulating their environment and food supply to their own advantage (Rowley-Conwy 1983;. 1997; 1998) and that the entire 'Neolithic package' might have been more fragmented than was previously believed. Thomas (1991) suggests that the Neolithic did not just bring a change in economy and that although becoming Neolithic may not have occurred in a uniform manner across Britain, when it did occur, its take-up was rapid and all-inclusive. It is against this background, that the '*indigenist*' models and the concept of 'neolithisation' have emerged.

Neolithisation

In much of the literature which describes the transition to agriculture in Europe, the term Neolithic has been used to describe an economy based on the cultivation of domesticated cereals and animals which replaced the previous hunter-gatherer subsistence economy that was dependent upon wild resources. Traditionally, Mesolithic hunter-gatherers and Neolithic farmers have been defined by their economic strategies. It was widely accepted that agricultural groups were sedentary and that monument construction was only made possible by permanent settlement and a surplus in food production and that the Neolithic as seen in the Windmill Hill causewayed enclosure was in a "mature and fully extended form" (Case 1969, 180). More recently other models for population pressure, environmental change, alterations in social structure and ideology have been put forward to explain the transition (Thomas 1988, 1991, 1999; Whittle 1985, 1996). It was in an attempt to understand the changes in material culture and social organisation that the term 'neolithisation' came to be used. Ammerman and Cavalli-Sforza (1971; 1984) regarded the onset of farming as a technological change with a different set of lithics and the appearance of pottery. To Ammerman and Cavalli-Sforza (1971; 1984) becoming Neolithic was a social process that is seen in the domestication of cereals and animals, that is, in Hodder's words "the taming of the wild" (Hodder 1990).

The difficulty has been in obtaining a clear recognition of what constitutes a farming economy in the archaeological record, but also inextricably linked with the agricultural process has been the interpretation of the social context within which it occurred. Also presupposed is that this new farming economy went hand-in-hand with monument building and a new tool technology.

It is generally agreed that the transition to farming involved a change from an economy that was reliant on wild resources, to one that involved the cultivation of domestic cereals such as emmer wheat *(Triticum dicoccoides)*, einkorn *(Triticum boeoticum)* and barley *(Hordeum spontaneum)* together with the selective breeding and animal husbandry of cattle, sheep and/or goats and pig. It is also accepted that domesticated species developed in the area traditionally known as the fertile crescent of the Levant, southern Turkey and Mesopotamia (Bell and Walker 1992) and that domesticated cereals and sheep were not native to Britain (Darvill,1987:49). The recognition of domesticated species in the archaeological record has been particularly difficult and although it is generally assumed that domesticated animals are smaller than their wild predecessors, size as an indicator of domestication is not in all cases convincing, particularly when there is a paucity of archaeological data (Grigson 1989). The discovery of cereal pollen before the elm decline as an indication of cereal cultivation by hunter-gatherers, can sometimes be doubted due to the difficulty in obtaining a reliable identification of cereal pollen grains (Moore et al. 1991; Edwards and Hirons 1984). This is discussed further in Chapter 4.

Sahlins states, however, that 'affluent foragers' (Sahlins 1974) would only adopt farming in extreme circumstances, i.e. through loss of a staple resource or a diminution of the local environment. Farming as a method of obtaining food is more labour intensive than hunting and gathering and brings changes in social organisation and procurement strategies that do not benefit everyone equally. Lee and de Vore (1968) suggest that hunter-gatherers eat better and work less, therefore, farming is not necessarily an inevitable choice. Ethnographic studies often focus upon economic factors and take little or no account of any social changes that might be implicit in adopting farming.

There is an increasing body of archaeological data that is available from Europe and Scandinavia which suggests that the transition to farming was a process that was not uniform, but had large regional variations (Rowley-Conwy 1983, 1986; Zvelebil 1995b,1986; Zvelebil and Rowley-Conwy 1984; Zvelebil *et al.* 1998; Dennell 1985; Dolukanov 1986; Scarre 1983; Whittle 1985, 1996; Jennbert 1985, 1998; Fischer 1995). Both Zvelebil (1995b) and Thomas (1987, 1991, 1999) suggest that economic change might have come about either as a cause or as a consequence of the changes in ideology and material culture that were made available from about the end of the sixth millennium BP. These new changes are seen in the appearance of funerary monuments, more permanent house structures, ceramics and a different technology for lithic production which included ground and polished stone. Dennell (1985), Zvelebil (1995b, 1986), Zvelebil and Rowley-Conwy (1984) and Rowley-Conwy (1986) propose that these new Neolithic elements were made available through a 'farming frontier' where exchange of ideas and artefacts could be made between hunter-gatherers and farming groups without either group losing their cultural identity (Zvelebil 1995b).

In Britain it is difficult to see exchange of ideas or material culture in the archaeological record as found in eastern Europe and it is not always clear whether it was the change in economy or the building of monuments that prompted the 'neolithisation' process, that brought these elements together. Thomas, however, believes that monuments were not an "optional extra", but were fundamental to the British Neolithic (Thomas 1999, 35) and it is monuments that we first see in the archaeological record in Britain that suggest a change in society had taken place.

The framework within which the 'neolithisation' process took place is still vague, both in Europe and Britain. Zvelebil (1995b) implies that if the term 'neolithisation' cannot be applied universally it becomes "worthless". He would prefer a standardisation of the term to allow a clearer recognition of foragers and farmers in the archaeological record (Zvelebil 1995b, 108). For the Balkans evidence, this would certainly facilitate a better understanding of the 'transition' sites, where it can be difficult to separate foraging and farming groups. In Britain, however, although there is clear recognition of both Mesolithic and Neolithic sites, while evidence for the transition process itself remains elusive. The modelling of a 'farming frontier' by the *indigenists* goes some way to explaining the transition process in Europe.

Farming Frontier

The agricultural frontier is described by Zvelebil (1995b, 127) as a "conceptual and cognitive construct" which can be used to model the process by which the transition to agriculture occurred in Europe (Dennell 1985; Rowley-Conwy 1986; Zvelebil 1986; 1995b). The evidence is drawn from the material culture of the late Mesolithic Bug-Dniester and early Neolithic Cris-Körös groups, contemporary societies in the Balkans, where Zvelebil has suggested there is the earliest evidence for agro-pastoralism from the early eighth millennium BP (Zvelebil 1995b, 120). He interprets the material culture of the Mesolithic Bug-Dniester societies of Moldavia as representing a transitional society, which took fifteen hundred years to evolve into becoming part of the Cucuteni-Tripolye culture that eventually replaced it, having moved from the *availability* phase represented by ceramics, into *substitution*, about 6500 BP, when wild resources were still evident, but within a limited pig and cattle economy with some cultivation. The lack of forest clearance and cereal pollen is seen as evidence of forest farming by indigenous groups who managed this resource by coppicing trees and collecting leaf fodder for herded animals.

Although the Bug-Dniester forager groups have elements of farming with grain impressions of domesticated cereals on pottery, grinders and composite sickles, the average overall percentage of domesticates never rises above fifty per cent. Bug-Dniester groups do not themselves become farmers, but become integrated, with other groups, to form the farming culture of the Cucuteni-Tripolye. This situation corresponds with Hunn's model of hunter-gatherer behaviour, mentioned above, (Hunn 1982) where the Bug-Dniester groups do not lose their cultural identity and have a small percentage of farming elements. An agricultural frontier is assumed between the Bug-Dniester and the Cris-Körös groups as they are in existence contemporaneously and although the percentage of domesticates found on Bug-Dniester sites remain within a wide range of between three and fifty per cent (Zvelebil 1995b, 120) it still makes the 'availability' model highly testable.

Zvelebil believes that the agricultural frontier facilitated the changeover to farming by allowing indigenous groups to develop new ideological and economical strategies from contact with farming groups who were living elsewhere. He suggests that the

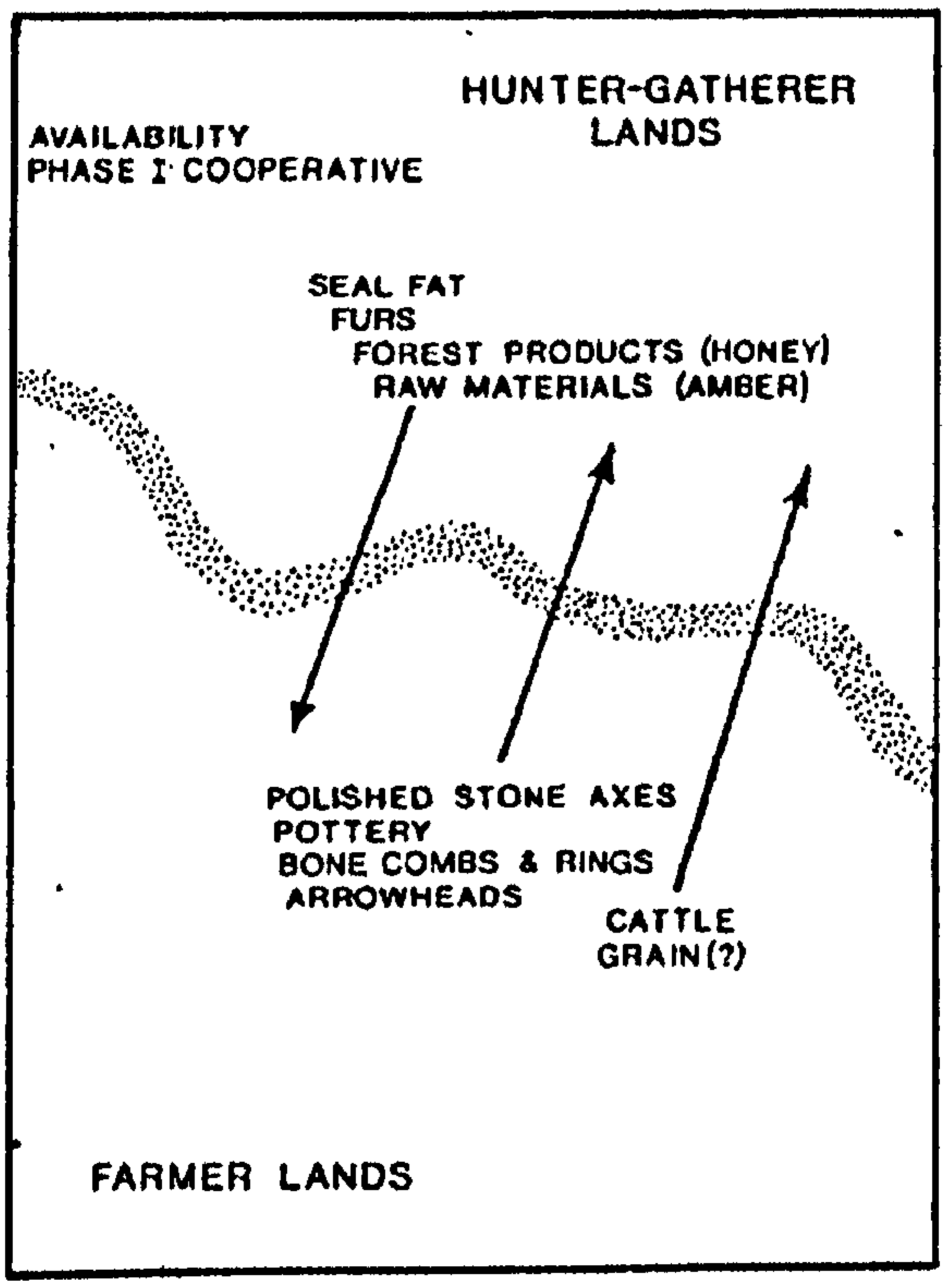


Fig. 9 Forager-Farmer contacts expected during the co-operative part of the *availability phase* (Zvelebil 1995b)

pattern of events began with co-operation by both groups, but that eventually competition between them prompted the shift to farming by hunter-gatherers. Ertebølle pottery contains plant tempering, which is similar to that of the *LBK* and s hoe-last adzes, T-shaped antler axes, bone combs and rings are found in Ertebølle sites in Denmark; domesticated cattle bones are found in small numbers from Mesolithic sites in Denmark, Scania and northern Poland (Zvelebil 1995b) and the site at Ferriter's Cove, Co. Kerry (Woodman 1999). The presence of artefacts of this kind on Mesolithic sites does suggest some form of contact with farming groups. At the same time, the existence of a farming frontier appears to have delayed the take-up of farming in the Ertebølle case (Rowley-Conwy 1983).

Dennell (1985) points out that both groups would have a vested interest in an amicable relationship, since early farmers would not necessarily have had superiority over the indigenous population and each group could benefit from contact. Dennell suggests that hunting groups might have lost women to farmers, which could have had a detrimental effect on hunter-gatherer numbers (Dennell 1985). Although Dennell supports the *indigenist* camp with the idea of the deliberate woodland management by the local population, he does not take into consideration the possibility of farming groups having mobility. He emphasises that farmers would have been more sedentary than hunter-gatherers and less likely to make long journeys, so that any contact would have been by hunters entering farming territories and returning to experiment with farming elements.

Dennell has applied his model of a farming frontier to Britain suggesting that there is palaeoenvironmental evidence to support the idea that Mesolithic groups attempted to increase their food supply by attracting game through forest clearance or by the collection of winter fodder (Simmons and Dimbleby 1974) and that the knowledge of farming was carried out through hunter-gatherer contacts with farming communities from the north European coast.

The palaeoenvironmentalist approach of Higgs and Jarman (1969) and Higgs (1972) argues for a more gradual and widespread process of selected culling and herd management of wild animals, prior to full domestication by complex Mesolithic hunter-gatherers. Mellars (1975) maintains that Mesolithic groups deliberately used burning to attract game to clearings, but this is based upon the activities of North American Indians and we cannot always transfer this kind of activity to prehistoric hunter-gatherer behaviour because evidence of repeated burning has been found in the pollen record. Caseldine and Hatton (1993), Edwards (1993; 1996) and Simmons (1993;1997) Simmons and Dimbleby (1974) show the possibilities for woodland interference by hunter-gatherers, either through repeated burning, the collection of ivy for fodder or the evidence of pre-elm decline cereal pollen. Little of the palaeoenvironmental evidence can be securely linked with the archaeological evidence and although it highly probable that hunter-gatherers were manipulating their environment through a complex system of woodland organisation, the data is speculative at present. (Discussed more fully in Chapter 4).

Dennell's model for Britain is based on hunter-gatherer contact with a variety of farming groups from the North European coast and although he puts forward three different kinds of frontier for the Continental evidence, for example, 'static', 'open static' and 'closed', it is based purely upon economic innovations adopted in varying degrees by the local population who could see infinite benefits from a farming economy and lifestyle (Dennell 1985).

However, In Britain we have no evidence of a farming frontier, as suggested by Dennell (1985) Zvelebil and Rowley-Conwy (1986) and Zvelebil (1984; 1986; 1995b) for central and north west Europe or the kind of 'transition' sites that are found in the Balkans or in Denmark (Zvelebil and Rowley-Conwy 1986). Once the North Sea Basin was breached by the 8th millennium BP (Bell and Walker 1992) Britain's tool technology develops in isolation (Jacobi 1976) and although it is accepted that domesticates were introduced to Britain, they are confined to Neolithic sites. In Britain, the early Neolithic is principally seen in monuments and although sites such as the Hazelton long barrow (Saville 1985) and the Hembury causewayed enclosure in Devon (Liddell 1935; Berridge 1986) have evidence of Mesolithic activity beneath them, there is no evidence of continuity from the Mesolithic period (see Chapter 7).

The 'Availability' Model

Zvelebil (1986; 1995b) and Zvelebil and Rowley-Conwy (1986) have put forward a model for the transition to farming in Europe, where there is clear evidence of a symbiotic relationship between hunting and farming communities. It is based on the existence of a farming frontier and gives the indigenous population a role to play. Using economic evidence from eastern Europe the model calls for the transition to have occurred in three distinct stages: an *availability* stage where material goods and information could be exchanged, without either foragers or farmers losing their social identity. Zvelebil suggests that there should be no more than 5% of domesticates on hunter-gatherer sites during this phase; a *substitution* phase where hunter-gatherers may still retain some foraging activities, but the archaeological record will show approximately less than 50% of domesticates on site. This is the stage where "neolithisation" is presumed to have occurred and hunter-gatherers have replaced hunting strategies with pastoral farming. The final *consolidation* phase is when there is a complete shift to agriculture with a predominantly Neolithic economy having been adopted by the hunter-gatherer communities, with domesticates making up to 100% of the faunal evidence on site. The model assumes that the palaeoenvironmental evidence is directly related to the local economy and that also there is a direct link between economic and social change (Zvelebil 1986; 1995b; Zvelebil and Rowley-Conwy 1986).

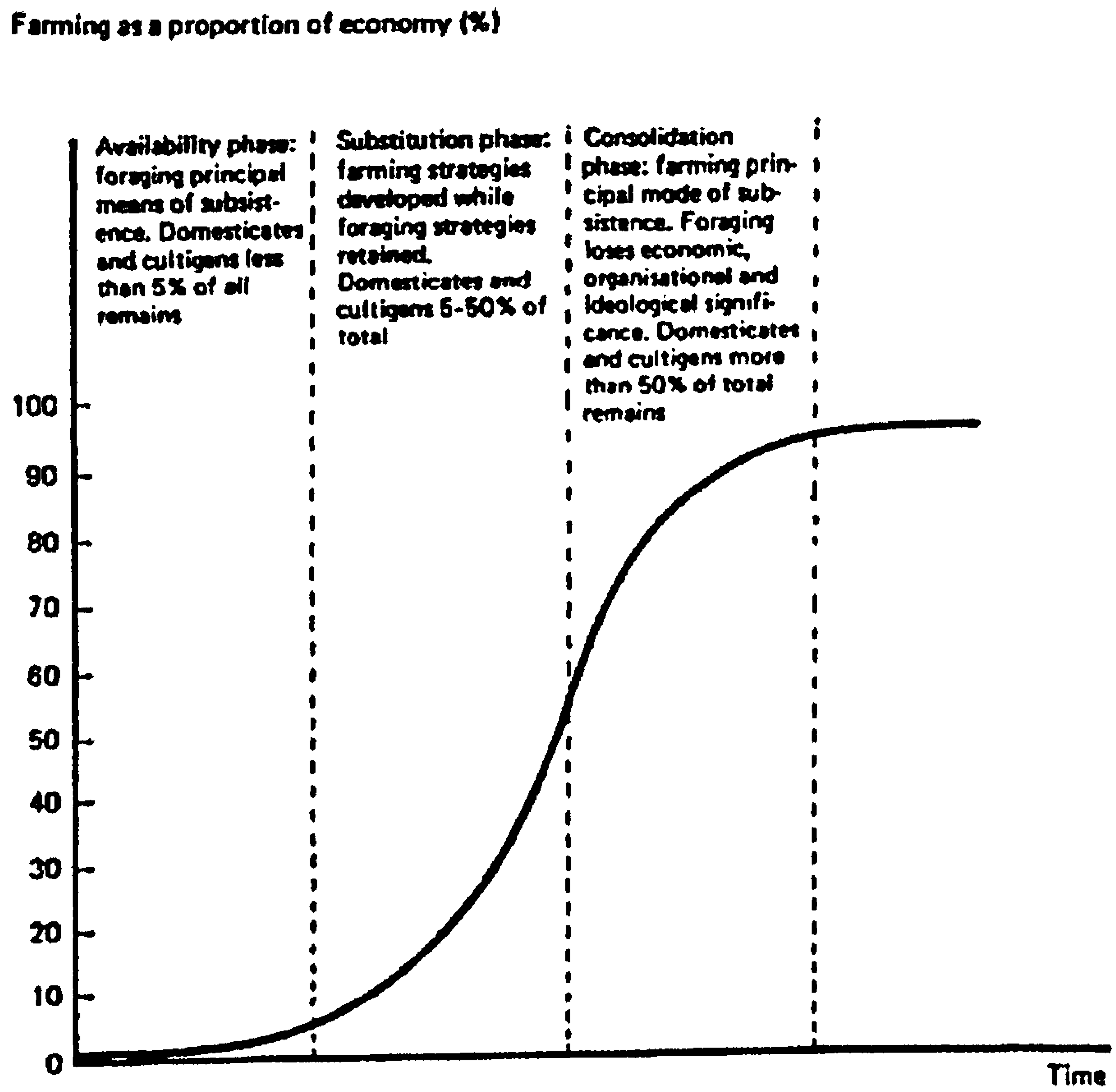


Fig. 10 The 'availability' model of the transition to farming. (Zvelebil 1995b)

The 'availability' model is primarily based on identifying the differences between foragers and farmers in the archaeological record. It works particularly well with the eastern European evidence where the Mesolithic Bug-Dniester sites show an aceramic *availability* phase between 6950-5950 BP where Bug-Dniester hunting groups have contact with the Cris-Körös farming communities and adopt Cris-Körös ceramics, together with domesticated cereals, grinders and composite sickles on a small scale. By 6450 BP some of the sites were in the *substitution* phase with elements of hunting still present, but with cattle and pig husbandry and cultivation. After 6450 BP evidence of the Bug-Dniester foragers has vanished from the archaeological record and it is assumed that they probably became established within the Cucuteni-Tripolye culture (Zvelebil 1995b). To the north-east of the Bug-Dniester groups, the Dnieper-Donetz foragers had roots in the Mesolithic and contact with the farming groups of the Tripolye. Some of the Dnieper-Donetz groups had adopted pottery by 8350 BP and become Neolithic, but some groups remained aceramic and were probably essentially hunter-gatherers, until the domestication of the horse by 5450 BP. The evidence suggests that within the *availability* stage some groups of the same culture adopted farming elements and others did not. Whilst the evidence does not fully explain why this occurred, it does suggest that foragers were able to resist farming if they chose to do so and that only particular elements of farming were taken up as and when required.

The 'availability' model creates a clear economic division between hunter-gatherers and farmers as distinct, cultural groups. This division barely allows for overlap in economic terms, for example, that there might be mobile farming groups where hunting still played an important role in the economy, or where foragers might be practising some form of plant or animal husbandry together with some sort of agriculture on a small scale. It does not allow for a long *substitution* phase where a 'foraging-farming' lifestyle might become well established in its own right, where groups may carry out both hunting and agriculture. Ethnographic evidence, however, suggests that such a state of flux does not exist in modern hunter-gatherers. Hunn states that the adoption of agriculture by hunter-gatherers was a dynamic process that occurred rapidly, even though this process might take a thousand years. Hunn suggests that hunter-gatherers are not heavily dependent upon one resource alone and that dependence upon farming rests upon one of two extremes: either groups depend upon it to a small extent, or they depend upon it completely. In order to bridge the gap between these two extremes, Hunn suggests that the adoption of farming is, therefore, a dynamic one (Hunn 1982, 5). This proposition would fit well with the transition evidence in Britain where we do not have Mesolithic sites with farming elements, but where we do have Neolithic sites that suggest dependence upon some form of agriculture (discussed further in Chapter 7). The model does not take into account either a total resistance to farming, or a long availability phase, such as in the Ertebølle example, where there is little or no substitution phase but a rapid consolidation when farming is adopted totally.

Thomas criticises the 'availability' model on the grounds that it is too heavily biased towards hunter-gatherers, with changes in social organisation being regarded as subsidiary. Thomas does not regard the problem as one that can be seen in such clear-cut economic terms, but proposes that there is more than one type of Neolithic and that the changeover to farming in Britain did not occur in a uniform manner (Thomas 1996).

However, it is still very difficult to test the 'availability' model on the evidence from Britain. Monuments are the first indication that there is a change in society and although we see the beginnings of social organisation with their construction, we are only getting a hint of economic change with the deliberate deposits of domesticates and pottery at the causewayed enclosures (Liddell 1936; Smith 1965; Mercer 1980). If monuments are put into the *availability* stage it would be a long one, with little or no evidence of *substitution* and then *consolidation* at the end of the Neolithic and beginning of the Bronze Age, when permanent settlement and arable fields are more permanent features in the landscape.

Strictly these are not valid comparisons as we would be drawing evidence from different registers as the domesticated bone and grain found within the causewayed enclosures was probably deposited within a ceremonial context, rather than an economic indication of a fully-fledged farming system. Although we can see differences between foragers and farmers in the archaeological record which is how Zvelevil sees the model working at its best, in Britain the foragers remain a completely separate culture from the farmers, who themselves may not be fully-fledged at the point of *availability.*

Without considerable modification there does not appear to be a way of successfully applying the 'availability' model in Britain on the present evidence and because it is so difficult to test on the British data, it suggests that the transition to agriculture happened in a different way to that in Europe and new models must be sought to take into account the differences between the British and European evidence.

Social Changes in the Neolithic

Neolithic monument construction began more or less synchronously throughout Britain at the end of the sixth millennium BP with the Whitwell long cairn being one of the earliest constructions at 5380 ± 90 BP (4433 – 3981 cal.BC) OxA-4176) (Hedges *et al.* 1994). Thomas regards monuments as being fundamental to the Neolithic way of life, but suggests that an economic surplus does not necessarily have to be in place to permit their construction (Thomas,1991; 1999). Ethnographic studies of the Ohio Hopewell show that it is possible to exploit a wide range of wild resources as well as cultivating small garden plots (Braun 1986). Thomas also cites the activities of sedentary hunter-gatherers from North America who constructed large enclosures in the Mississippi Valley (Thomas 1999, 23). Sahlins (1974) suggests that hunter-gatherers had time to spare when they were not hunting and Thomas proposes that it was quite feasible for hunter-gatherer groups to build monuments even though they might have been on the move, at least for some of the time. Thomas believes that it was over a slow process of economic change, that the rapid introduction of Neolithic material culture was allowed to take place with hunting not being phased out until well into Bronze Age (Thomas1999).

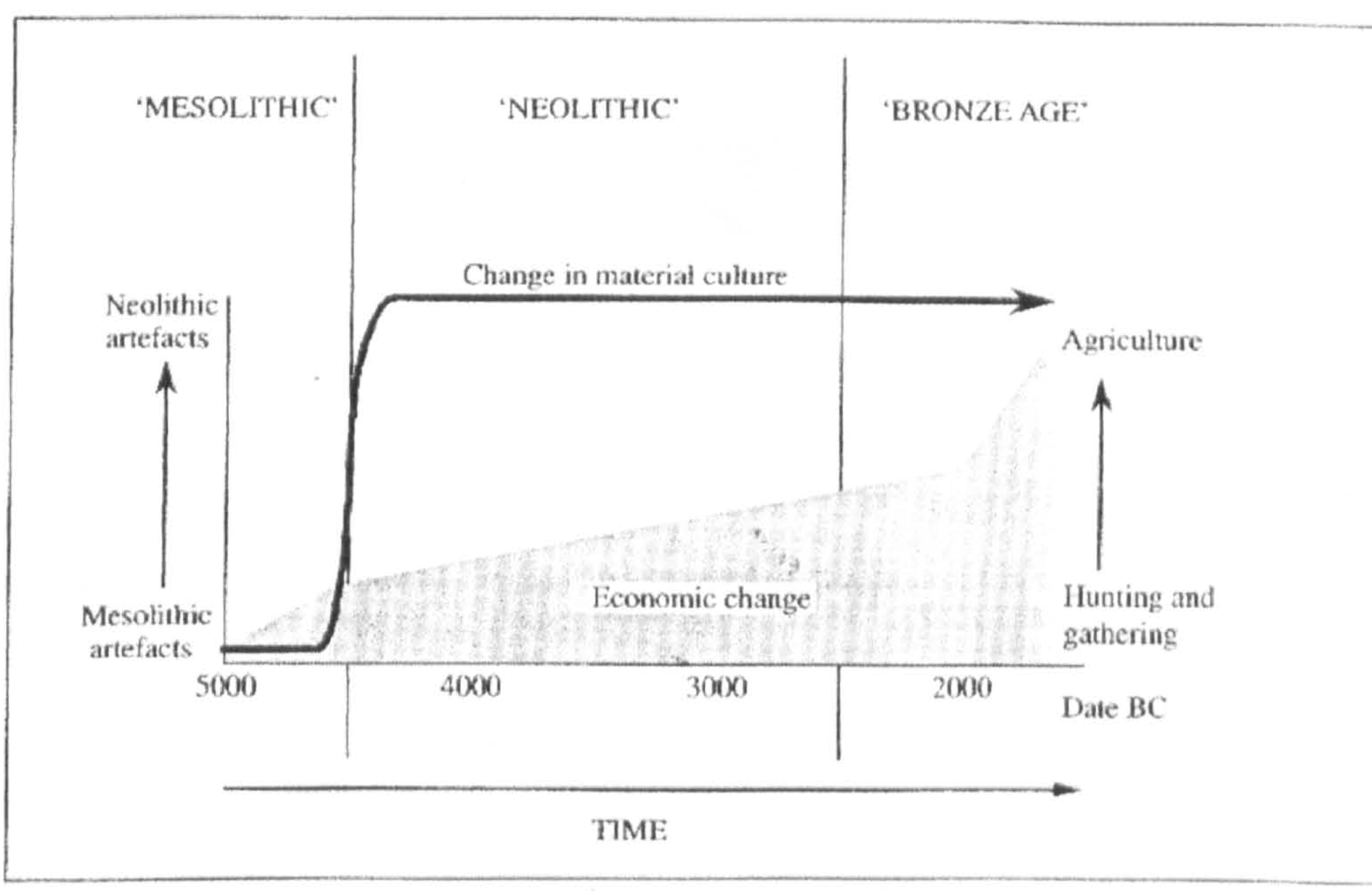


Fig. 11 Thomas' suggestion of a slow process of change during the Mesolithic-Neolithic transition. (Thomas 1999, 16)

Thomas does not accept that a farming frontier was available in a British context or that we will ever have the transition sites that are found in Europe, but he assumes that there was a native population that took up Neolithic material culture through an existing network of contacts and exchanges. The transition from foraging to farming took a long time, because for comparatively long periods people had entirely supportable ways of life that combined the use of wild and domesticated resources (Thomas 1997). Thomas suggests that when farming was finally adopted, the take-up was rapid (1988; 1991; 1999). He also suggests that there was more than one Neolithic and by the time farming reached Britain at the end of the 7th and the beginning of the 6th millennium BP, the kind of homogeneity that had previously been seen in the *LBK,* had been lost. Thomas feels that the process of becoming Neolithic was more than an adaptation of farming techniques, but included a transformation of social relations as well and when it was taken up, it was done so as an entire package (1988, 62). Although Thomas's view of the transition is based on a theoretical model, he does take into account the social changes that came with the Neolithic, rather than treating the transition as purely an economic phenomenon.

Whittle supports the *indigenist* view and states that "foragers only slowly became farmers around the northern and western periphery of the *LBK* culture". He suggests that the transformation from foraging to farming may have had more to do with the Mesolithic than with colonising farming communities. He takes this idea further back chronologically to propose that *LBK* communities may have had their roots in the indigenous Mesolithic, rather than within new colonising farming groups and that forest farmers shared many lifestyle similarities with coastal foragers (Whittle 1966,146). Whittle also accepts Thomas's theory that once transformation came, it was abrupt and not particularly linked to a subsistence economy or to any environmental factors (1966,178). He also states that it is difficult to show the shift from the Mesolithic to Neolithic in Britain due to the lack of archaeological evidence, or to specifically date the end of the Mesolithic and the beginning of the Neolithic and agrees with Thomas that to catch the changeover in action is probably impossible in this country (Whittle 1996; Thomas pers. comm.) Whittle suggests that the European Mesolithic were knowledgeable and resourceful and may have experimented without a total commitment to farming in the early stages, making the final transition less dramatic. It was more of a slow convergence with the final push being more of a 'spiritual conversion' with attention to ancestors and sacred places (Whittle 1996).

Although both Whittle and Thomas put emphasis on social change, they are ignoring the fact that we do not have the economic evidence which shows an overlap between the Mesolithic and the Neolithic in Britain or that farming was taken up in a total economic package at the beginning of the Neolithic. Moffett *et al.* (1989) suggest that the evidence for fully-fledged of permanent field systems and settlement in Britain is not seen until the Bronze Age, but the radiocarbon dates for the Céde Fields, Co. Mayo, of the first half of the 5th millennium BP, suggest that field systems may have been in use in the early Neolithic in Ireland (Caulfield *et al.* 1998).

Whittle argues for continuing patterns of mobility throughout the Neolithic period (Whittle 1996) even amongst the *LBK*, who are traditionally seen as a sedentary farming community. He agrees with Thomas (1999) that people changed their thoughts and ideas before they changed their economy, but unlike Thomas, suggests that foragers experimented with elements of farming without totally committing themselves to a new lifestyle.

Bradley (1993, 68) also agrees that it was not farming that lead to monument construction, but the indigenous population having a different "perception of the world" which eventually allowed agriculture to be taken up. It was a "different attitude of mind" rather than domesticated species that made economic change possible (Bradley 1993, 21). Although Bradley points out that there is some similarity between long mounds and the longhouses of the *LBK*, he suggests that the *LBK* had disappeared from the archaeological record, by the time of the appearance of the first monuments (Bradley 1993, 16; Thomas 1991).

Whittle (1996) argues for cattle to have been as important for their social value as for meat. Woodman's interpretation of cattle bone from Ferriter's Cove, Co. Kerry, supports this view (Woodman 2000). At the causewayed enclosures cattle bone dominate the faunal remains (Smith 1965; Barker and Webley 1978; Simpson 1971; Mercer 1980, 1981; Legge 1989). However, the high numbers of female cattle at sites such as Hambledon Hill may not necessarily indicate dairying (Entwistle and Grant 1989, 205). Entwistle and Grant (1989) argue that the large numbers of female cattle bones recovered from the causewayed enclosures are not as a result of dairying, as in most animal husbandry systems the males would have been killed for meat, with the females kept for breeding. They suggest that the human capacity to digest lactose is only evident in societies that have had prolonged exposure to cow's milk. They indicate that we do not have secure evidence for dairying in the early Neolithic as most of the evidence comes from ceremonial contexts and the data is more indicative of cattle being associated with prestige than being an essential part of the economy (Entwistle and Grant 1989).

Using ethnographic evidence Legge disputes the lactose argument indicating that African herders use milk in a processed form, that has been fermented, which does not make the intake of lactose a problem (Legge 1989). At the Bronze Age site at Grimes Graves, Norfolk, it was suggested that the high numbers of young cattle bones represented a deliberate killing in order to release the milk for human consumption (Legge 1981). Entwistle and Grant (1989) argue that it is impossible to know what proportion of animals were born on site, or how many may have been brought in from elsewhere. They do not accept that deliberate killing of young animals would be a good husbandry policy as this might have implications for the future self-sustainability of the herd (1989, 206). Legge emphasises that cows were able to be milked in the absence of their calves by artificial stimuli (1989, 226) and this adds weight to the reasons for the high number of young cattle bones at Grimes Graves.

Legge suggests that the number of animals that are kept for dairying would be at a minimum in order to maximise the output. He states that exploiting cattle for milk was 3-4 times more efficient than for meat (1989, 232). Legge believes that his interpretation of the data is more convincing than Grant's and that she can offer no alternative interpretation apart from the suggestion that cattle could have been moved in and out of Grimes Graves (Legge 1989; Entwistle and Grant 1989).

Although both arguments are convincing, the lack of water at Hambledon Hill is a factor that should be taken into account if a dairying herd was to be kept enclosed for any period of time. Even on a temporary basis this would produce logistical problems of providing sufficient water to keep the herd alive (Mercer 1990).

Scotland and Ireland

In more marginal areas such as Scotland there appears to be a research bias towards the west coast. Recent work considers that there was no time-lag in Scotland or Ireland for the take-up of agriculture in comparison to England. David's work in South Wales (1989) also shows that the Welsh evidence fits within the English chronologies.

Armit and Finlayson stress that the transition in Scotland was gradual and not one of replacement, but that hunter-gatherers had an active role to play. They suggest that the indigenous population may have adopted some elements of farming, such as pottery, which might have had more symbolic significance than economic (Armit and Finlayson 1992). They do not view the transition in Scotland as coming from any pan-European movement, but suggest that it was extremely regional and varied.

Armit further proposes a body of theory for the transition in Scotland based on ethnographic evidence and European analogy, on the assumption that throughout Scotland there is evidence for pottery on sites used by hunter-gatherers (1996, 283). Mesolithic sites such as Ulva Cave, Bolsay Farm, Islay and Kinloch, Rhum have evidence of Neolithic pottery which might be seen as either showing continuity or re-occupation. Armit proposes that certain aspects of Neolithic culture can be adopted by hunter-gatherers, that might be useful, but will also fit into the existing economy, such as pottery. However, Armit fails to address the Scottish situation by critically assessing the archaeological evidence, in that the Mesolithic sites that have been found with pottery assemblages, may not unequivocally be attributable to hunter-gatherer acquisition. Although Armit takes the *indigenist* stance, it is based on theory rather than hard archaeological evidence.

The Irish evidence also has a geographical research bias, with more research having taken place in Northern Ireland (Woodman 1985; Shee Twohig and Ronayne 1993). There are a scatter of late Mesolithic sites across the Midlands and the east coast, together with those at Ferriter's Cove, Co. Kerry and Bally Lough, Co. Waterford in the south (Green and Zvelebil 1990). The Irish Mesolithic, however, developed in a different way to that in England, with a different fauna and flint technology. Antler tool and bone assemblages are not found in Irish contexts (Woodman 2000, 220). This is not due to preservation problems, but because of the lack of red deer before 5000 BP. Aurochs and elk are not found in Ireland and wild pig dominates the faunal evidence and few red deer bones have been found on Mesolithic sites. The tool typology of the Irish Mesolithic shows a broad blade industry at the end of the Mesolithic period, which includes Bann flakes, in contrast to the small, geometric microliths of the narrow blade industries from English sites. Settlement patterns in Ireland are, therefore, predominantly coastal, with a strong marine economy, or riverine and lakeside sites that have a mammal hunting content (Woodman 2000).

The transition to farming in Ireland has been viewed somewhat differently from that in England. Initially, Woodman (1978) did not support the idea of a Mesolithic contribution towards the adoption of farming and subsequent researchers appear to have relied too heavily on Williams' use of radiocarbon dates (Williams 1989). The very early dates for the Neolithic house at Ballynagilly have more recently been regarded as insecure (Thomas 1988,61; Woodman 2000, 233) and Williams' study for the introduction of food production into Ireland (Williams 1989) has placed too much reliance on the Ballynagilly dates. Green and Zvelebil's work in the south east (1990) suggests a co-existence between Mesolithic and Neolithic communities, but they also rely on Williams' radiocarbon dates for overlap.

One of the problems in identifying the transition in Ireland is that much of the raw material comes from beach flint, which was used by different groups up until the Bronze Age. The difficulty is, therefore, in trying to avoid the interpretation that Mesolithic and Neolithic groups might have been contemporary (Woodman 2000). The use of radiocarbon dating to suggest an overlap between the Mesolithic and the Neolithic in both Britain and Ireland is discussed in Chapter 7, but Woodman emphasises that there is a gap in the archaeological record between about 5500 BP and 5000 BP. There are no transitional assemblages as such in Ireland that are secure enough to suggest overlap, although there appears to be a shift from a marine to a terrestrial diet by the Neolithic. The Poulnabrone portal tomb in Co. Clare is situated only 10 kilometres from the sea, but has evidence of a land-based diet.

At Ferriter's Cove, Co. Kerry in the south west of Ireland, radiocarbon dates indicate a later Mesolithic phase for the site, but there is also a Neolithic presence in the form of a plano-convex knife, together with domesticated cattle bone. Two radiocarbon dates have been obtained from the cattle bone: 5510 ± 70 BP (OxA-3869) from a tibia and 5825 ± 50 BP (OxA-8775) from a metatarsus (Woodman and McCarthy in preparation). Although Woodman believes that the knife was intrusive, he feels that domesticated cattle bone in Irish contexts of this kind is more likely to have been a deliberate introduction (Woodman 1993; 2000). He can find little evidence for a fully developed Neolithic until after 5000 BP (Woodman 2000) and suggests that the cattle bone at Ferriter's Cove represents an *availability* phase prior to a full agricultural economy. Aurochs have not been found in Ireland (Woodman 2000) and the cattle bone at Ferriter's Cove must, therefore, be a human introduction, rather than any natural evolution from wild cattle, although the date places it in the Mesolithic period. Woodman suggests that the presence of the cattle bone at such an early date could represent Neolithic elements that have been incorporated into a Mesolithic lifestyle that arrived in Ireland by gift exchange through a farming frontier with England (Woodman and McCarthy, in preparation).

It is highly probable that there was contact between Ireland and Britain in the Mesolithic period, but the evidence for an 'interactive zone' between Britain and Ireland has not been found. However, Woodman may be right in that it might have been a mixture of *indigenism* and immigration that brought farming to Ireland.

There is a variable Mesolithic throughout Ireland, but uniformity appears with the Neolithic, which in some respects is similar to that in England, with causewayed enclosures, such as Donegore in Co. Antrim, appearing as one of the earliest monuments (Mallory and Hartwell 1984). Court tombs are also one of the earliest monument types in Ireland, but tombs of this type are not found in Britain.

O'Sullivan's work at Carrigdirty Rock on the Shannon estuary, Co. Limerick has evidence of both cattle and wild pig, together with basketry, worked wood and stone and human remains. Radiocarbon dates from the site suggest they are early Neolithic. O'Sullivan is hesitant about interpreting it as either a late Mesolithic site or a site used by early pioneer Neolithic farmers and suggests it could fit into the *substitution* phase and be occupied by a group of "marshlanders", without assigning any distinction to them (O'Sullivan 1997 a and b 2000). However, the late Mesolithic date from the worked wood either suggests that this may be the result of an 'old wood effect' (Williams 1989; Baillie 1995) or that it could have drifted in from elsewhere in the estuary. O'Sullivan's interpretation that this might be a 'transition' site appears to have two separate phases of activity.

Discussion

There has been little attempt to address the question of what happened to hunter-gatherer society? Were they wiped out by incoming farmers or assimilated into farming society? It is only Dennell (1985) using historical evidence, that suggests that disease might have wiped out the hunter-gatherer population. In Britain we do not have enough cemetery evidence to suggest that this was the case, or evidence of warfare between hunters and farmers, although there is enough evidence from sites such as Crickley Hill, Gloucestershire (Dixon 1988) and Carn Brea, Cornwall (Mercer 1981) to suggest that the Neolithic period may not have been completely peaceful. We do not, however, have enough archaeological evidence, either in Britain or Europe to be able to discuss the possibility of hunter-gatherers having been wiped out by disease with any degree of certainty, although recent historical examples suggests this might be one possibility.

The radiocarbon dates and the archaeological evidence that was used to produce the 'wave of advance' model, has been criticised by Zvelebil (1989) who suggests that the evidence has been stretched to fit the model. He states that some sites have no evidence of farming elements and too much emphasis has been placed upon the existence of pottery as an agricultural indicator. The 'wave of advance' model deals purely with economics and the advancing Neolithic is seen as a superior displacement of the indigenous hunter-gatherers in way that is much too uniform. It does not allow for any hunter-gatherer resistance and treats Europe as an homogenous entity, both from a topographical and cultural viewpoint.

The 'wave of advance' model is now treated as somewhat unfashionable in the light of recent research and Zvelebil's work in the Balkans has done much to perpetrate this view. The kind of 'transition' sites that are found in eastern Europe show that the 'wave of advance' model does not allow for distinct cultural groups of farmers and foragers, borrowing and exchanging ideas and artefacts over a considerable period of time, nor does it allow for long-term resistance by groups such as the Ertebølle (Rowley-Conwy 1983). However, although in Europe there are hunter-gatherer groups such as the Ertebølle who produced pottery and had knowledge of farming from cultivating groups to the south and east, which included the Michelsberg and the TRB (Milisaukskas 1978; Whittle 1996), but retaining their cultural identity, as did the Bug-Dniester groups and the farmers of the Cris-Körös. In British contexts we lack both evidence for any kind of 'farming frontier' or evidence of hunter-gatherer contact with the monument builders. This not only makes the 'availability' model almost impossible to test, but also suggests that the *diffusion* model should not be totally discounted when dealing with the British evidence.

In Britain, as in Ireland, we are not always able to make clear cultural distinctions between hunter-gatherers and farming groups. We assume that hunting was still important in the Neolithic period with the deliberate deposits of wild animal bone in the ditches of the causewayed enclosures, such as Windmill Hill (Smith 1965). Marek Zvelebil (pers. comm.) has suggested that the presence of wild animal bone in these contexts might indicate that monument builders were preserving their old associations of hunting, as well as demonstrating a new social order in monument form. In Britain we do not appear to have Neolithic sites with Mesolithic antecedents where we can trace continuity into earlier periods. Microliths do not appear in Neolithic contexts in England, although the Hembury causewayed enclosure (Liddell 1935; Berridge 1986) and the Hazleton North long barrow (Saville 1990) are two sites that have microliths from earlier contexts, but they are chronologically from the earlier Mesolithic phases.

The bulk of the evidence from Britain suggests that the Mesolithic and the Neolithic were separated chronologically, although cultural distinction between hunters and farmers is not always so clear when dealing with sites such the Sweet Track, Somerset (Coles and Coles 1986) (discussed in Chapter 5), and Ferriter's Cove, Co. Kerry (Shee Twohig and Ronayne 1993; Woodman 2000) and although the palaeoenvironmental evidence from Britain (discussed in Chapter 4) does suggest some indigenous involvement as a prelude to farming, it is by no means secure.

Neither the *diffusionist* nor the *indigenist* models fit precisely on the British evidence. The spread of farming as measured by radiocarbon dating is not seen as a uniform advance across Britain in an east west direction as there is a predominance of Neolithic monuments, with a spread of radiocarbon dates, across southern England in a haphazard way that often bear no relation to earlier Mesolithic sites (Chapter 7). Researchers in both the Mesolithic and the Neolithic periods persist in trying to fit the European models on to the British evidence, when it is apparent that what we are dealing with in this country is a different database to that in Europe. Theoretical models have been devised from the Continental evidence that often have no bearing on what has been found in England, Ireland or in Scotland. The late Mesolithic in

Britain and Ireland has much regional variation, both in the tool typology, as can be seen in the way the Irish Mesolithic has developed and in topographical location. This thesis will emphasise that what we have in Britain is very different to that in Europe. Britain became an island prior to the late Mesolithic, which means that our cultural development and transition to agriculture probably occurred quite differently to that in Europe and Thomas's implication that "there was more than one Neolithic" (1988) is a cautious reminder that we have a very different set of data to that in Europe and it must be treated accordingly. As much as we would like to be able to test the 'availability' model successfully, it just cannot be done on the evidence to date. New models must be devised for the British evidence, which might contain elements of both *diffusionism* and *indigenism*, however unfashionable that might be. We must look critically at the evidence we do have and assess any regional differences that might exist in this country, rather than expecting the kind of uniformity that has been found in some parts of Europe.

CHAPTER 4

SOCIAL COMPLEXITY OF LATE MESOLITHIC HUNTER-GATHERERS IN EUROPE AND BRITAIN

Introduction

It has often been assumed that indigenous hunter-gatherers had a role to play in the transition to farming and manipulated the environment prior to its adaptation. In Rowley-Conwy's studies of the Ertebølle cultures of southern Scandinavia (1983; 1986; 1997) the suggestion has been put forward that it was the complexity of hunter-gatherers groups which enabled them to resist farming for long periods of time and the Ertebølle are cited as an example of this. Rowley-Conwy (1997) suggests that hunter-gatherer groups of the late Mesolithic were not 'waiting' for the Neolithic to arrive, but were complex societies in their own right. The questions that have to be asked are: what is the evidence for social complexity in Britain? Are all hunter-gatherers in the Mesolithic period in Britain socially complex?

The increasing weight of evidence from palaeoenvironmental studies, although not always conclusive, implies that hunter-gatherer societies in late Mesolithic Britain were familiar with the landscape within which they lived and they could have been selective and manipulated the resources they chose to obtain (Simmons and Innes 1987). Simmons (1979) questions the reasons behind the need to manipulate the environment if resources were abundant in the Atlantic forest, especially if most hunter-gatherer groups were living at population densities well below the carrying capacity of their environment (Harris 1977). However, the ability of hunter-gatherers to control or attract wild animals through the use of fire to clear woodland and promote vegetation gorwth and browse for deer has been proposed (Mellars 1976; Simmons 1975, 1979, 1993, 1996; Simmons and Innes 1987, 1988, 1996 a and b; Caseldine and Hatton 1993; Lewis 1982).

In addition, hunter-gatherers may have undertaken some form of plant manipulation, as seen in the identification of pre-elm decline cereal pollen (Edwards 1989 a and b, 1993; Edwards and Hirons 1984; Edwards and Ralston 1984; Clarke 1976; Zvelebil 1994). The recovery of cereal pollen from pre-elm decline contexts has led researchers to suggest that this is the first indication of domestic cereals in the

Mesolithic period, prior to the introduction of domesticated grain such as emmer wheat (*Triticum dicoccum)* which has been found within Neolithic monuments. It should be stressed that the period before the elm decline is not necessarily pre-Neolithic. In Britain there are an increasing number of sites where pre-elm decline cereal pollen has been identified, but identification is often difficult and sample contamination can be a problem (Moore 1991; Edwards 1989b).

Further, the intention of hunter-gatherers to bury their dead with grave goods might also suggest some sort of social hierarchy and organisation that might constitute social complexity and evidence of this can be seen in the Mesolithic burials from Mendip, Somerset at Aveline's Hole, Burrington Coombe (Davies 1920-21), Gough's Cave, Cheddar (Davies 1904; Tratman 1975; Stringer 1985) and Totty Pot, Cheddar (Barrington and Stanton 1970; Norman 1982; C.J. Hawkes pers. comm). (This is also discussed in Chapters 5 and 6).

The domestication of animals as a marker of early agriculture has not been included in this chapter. In Britain there is no evidence for domesticated animal bone in Mesolithic contexts. Domesticated animal bone appears with monument construction and in this thesis has been regarded as a Neolithic component and would, therefore, not be regarded as an element of social complexity amongst hunter-gatherer groups. The domesticated cattle bone found in a Mesolithic context at Ferriter's Cove, Co. Kerry has been discussed in Chapter 3.

Ethnographic evidence of complexity

Drawing parallels from ethnographic studies, Cohen suggests that Mesolithic hunter-gatherers were small, mobile, egalitarian groups with simple divisions of labour and a flexible social organisation, in contrast to the more complex societies that may have had to establish leadership and social rules (Cohen 1977). Using ethnographical examples Cohen (1977) points out that the adoption of a more complex social structure among hunter-gatherers might have come about in order to maintain a balance between the resources that were available and the possibility of increasing population numbers. He stresses, however, that in the past hunter-gatherers were viewed as being at starvation level and although recent studies have redressed this idea, there is now a tendency to *overemphasise* the quality of hunter-gatherer lifestyles (1977, 27). He suggests that the hunter-gatherer standard of living might be better measured during times of stress, rather than at a time when food might be plentiful, as changes in economy and social structure are more likely to occur when a community is under stress than when it has enough to eat. He also suggests that generally most societies have a desire *not* to change. He believes that becoming a farmer would be more labour intensive and would not necessarily provide more nutrition in the early stages (1977, 35). He includes a note of caution as to whether modern hunter-gatherers adequately reflect prehistoric societies. Generally, Cohen believes that hunter-gatherers were better off than farmers because they had a greater amount of leisure time available and a much better diet (1977, 39) and he, therefore, questions why hunter-gatherers, who were economically successful within their environment, would take up farming at all (1977, 279). He suggests that agriculture would only be taken up under extreme pressure. This pressure might have come about if the population could not stabilise itself at its 'carrying capacity' due to continuing increase in population density and it is the attempt to keep an equilibrium between hunter-gatherer groups and their food resources that might force a change in economy (1977, 50). Cohen further divides his ideas by suggesting that the equilibrium is not so much between "man and his food" but between his cultural preferences, the amount of time he has invested in acquiring those preferences and the resources that had been modified by him in order to do so. He reinforces this idea with ethnographic evidence from the !Kung Bushmen which shows that modern hunter-gatherer groups can be extremely selective in their food choice, despite the wide range of foodstuffs available to them (Cohen 1977, 50).

At the end of the Ertebølle period, hunter-gatherer groups of Scandinavia were more or less sedentary, with a diet predominantly of shellfish. Because they had enough resources in one place, there was not the need to be as mobile as other hunter-gatherer groups elsewhere. The question that can be asked is, were the Ertebølle sedentary because of a growing population, or was it because they just did not have to travel over large territories in order to obtain a sufficient food supply? If becoming socially complex enabled hunter-gatherers to resist farming for longer, although the Ertebølle resisted it for over a thousand years (Rowley-Conwy 1983) what was it that prompted the changeover eventually? Although Rowley-Conway (1983) has suggested it might have been attributed to the decline of the oyster, if the Ertebølle were a sufficiently complex group to have resisted farming for a thousand years, the decline of one of their important food resources alone seems an insufficient reason to tip the balance towards a change in economy and other reasons must be looked at to explain this change.

Although the nature of Simmons' palaeoenvironmental work is different to the anthropological approach of Cohen, he agrees with the idea that Mesolithic hunter-gatherers had cultural food preferences, which may have had precedence over the resources that were available (Simmons 1979, 123) and groups would have adopted specific strategies to enable them to obtain those resources. In the case of the Ertebølle, their inclination to remain hunter-gatherers, whilst the knowledge of farming was available, must suggest it was a cultural choice with the understanding that they were able to obtain sufficient resources to be able to continue their lifestyle. There must have been little or no competition, either for resources, territory or warfare from cultivating groups to the south and east, which included the Michelsberg and TRB groups (Milisauskas 1978; Whittle 1996), to allow the Ertebølle to resist farming for over a thousand years. At the same time, however, this ability to resist a farming way of life may have also been instrumental in allowing it to develop as rapidly as it did, when it was finally taken up. The social organisation of the Ertebølle, must have been such that they were able to speedily adopt a Neolithic lifestyle when the need arose, whether it was dependent upon the oyster or not.

Ethnographic evidence supports exploitation of a large variety of plant foods (Lee & De Vore 1968) and although few plants survive on archaeological sites, the importance of vegetation use by hunter-gatherers should not be underestimated (Zvelebil 1994). Zvelebil (1994) indicates that the use of plants in the Mesolithic period is underestimated which is primarily due to their inability to survive in the archaeological record and David Clarke (1976, 454-5) suggests that microliths are as likely to have been used as composite tools for cutting vegetation as for projectile points and illustrates several examples of grating and cutting tools. Both Clarke (1976) and Zvelebil (1994) emphasise that a large and varied selection of wild plants would have been available during the Climatic Optimum, c.8000 – 5000 BP when the temperate forest would have reached its limits and the number of wild plants available would have been at its greatest (Zvelebil 1994, 35).

Sahlins (1974) suggests that 'affluent foragers' would only have turned to farming reluctantly and if the food resource from the Atlantic forest was sufficient to support an increasing population, other reasons must be looked for to answer Simmons' question: why was there a *need* to manipulate the environment? (Simmons 1979). If the size of population was regulated in relation to the food supply, disregarding any natural disasters or invasions, the forests and coasts could support fairly large family groups and might even have contributed to a rise in population if groups were staying in one place for longer periods of time (Harris 1977). This reasoning suggests other factors were responsible for economic and social change, one of which might have been cultural preference, which might have in turn led to the exploitation and diminution of what became a limited resource.

Ethnographic evidence has demonstrated that malnutrition and starvation that might keep population numbers low, is unusual among hunter-gatherers, in all but arctic and subarctic environments and that most groups live at population densities well below the carrying capacity of their environment (Harris 1977). It seems unlikely, therefore, that the carrying capacity of the Atlantic forest would have been insufficient to adequately feed the indigenous population. This suggests that by the late Mesolithic period the forest resource and a rich off-shore fauna was quite capable of supporting an increasing population (Simmons, 1975).

Social complexity in late Mesolithic Britain

Palaeoenvironment studies have been instrumental in suggesting that late Mesolithic hunter-gatherers were extremely active in the role they had to play regarding the adoption of agriculture, both in the way they may have controlled their environment (Simmons and Innes 1987) and in their possible ability to control or herd wild animals by practising some sort of animal husbandry by the collection of fodder (Simmons and Dimbleby 1974) or, through the use of fire to clear woodland and promote vegetation growth and browse for deer (Mellars 1976). It is the results of these studies that have enabled researchers to frequently challenge the traditional idea of colonists replacing the indigenous population, who had no part to play in the changeover to agriculture (Case, 1969; Ammerman and Cavalli-Sforza 1971; 1984).

Although the palaeoenvironmental results are not always conclusive, they do provide the suggestion that indigenous hunter-gatherers in late Mesolithic Britain would have been familiar with the landscape within which they lived and they could have been selective in the resources that they chose to obtain. The evidence from upland areas of Britain, such as Dartmoor, Exmoor and the Pennines, where there are repeated areas of burning, suggests that this burning may have had an anthropogenic cause. If this is the case, it also suggests that hunter-gatherers were prepared to invest time and energy into doing something in an area that would either be visited again, or where they were prepared to stay for longer periods in order to benefit from the results of their labour.

Caseldine and Hatton (1993), Simmons (1993, 1996) and Simmons and Innes (1996) indicate that there is the possibility of an anthropogenic cause for the evidence of clearance by repeated burning of upland areas such as Dartmoor and the North York Moors. Simmons' work on moorland landscapes (1996) also attests to the possibility of an environmental alteration of the landscape by late Mesolithic societies, but he goes on to question the reasons behind the need to manipulate the environment, if resources were abundant in the Atlantic forest. Simmons and Dimbleby (1974) propose that there was deliberate acquisition by hunter-gatherers of vegetation for animal fodder with the gathering of ivy (*Hedera helix* L.) although Edwards (1984, 22) points out that the lack of ivy in the pollen record does not necessarily reflect human interference. The collection of leaves for fodder is documented for the Swiss Neolithic (Simmons & Dimbleby 1974; Simmons 1996, 167; Simmons & Innes 1996a), but Simmons has to admit that although a great deal of management would have been needed for it, the pollen diagrams are not the best evidence for this activity, as the impact of leaf collection on pollen production is likely to have been negligible and is not well understood. If the deliberate collection of leaves and branches was taking place, it could suggest a certain degree of herd control or husbandry of game animals, with hunter-gatherers making the conscious attempt to bring game to where they wanted it, rather than to chase it through the forest, but it is difficult to unequivocally see it in the record. The interpretation that it was fodder collection that caused either an absence or an increase in ivy pollen is still conjectural and the use of leaves from other species is well documented (Charles *et al.* 1998).

If some kind of fodder was collected by hunter-gatherers, this might be interpreted as either a laziness and an unwillingness to travel large distances to hunt food under Zipf's 'least effort' principle (Jochim 1976, 56; Simmons 1996, 194) or a diminution of either game animals or territory, which meant that efforts had to be made to track and kill these animals within a restricted area. If the density of the Atlantic forest meant that the movement of deer was restricted, either because the animals themselves preferred a more open habitat, or that dense undergrowth made them difficult to track by hunters, it might have been more advantageous to attract them to chosen clearings, in order to ensure a kill.

In Britain the bulk food would have been game, with red deer being the most important food resource. Red deer and pig are found at more than eighty per cent of Mesolithic sites, with roe deer and wild cattle on fifty per cent of sites (Simmons

1975) with red deer being commonly the most important animal found on hunter-gatherer sites throughout Europe (Jarman 1972). Red and roe deer have well defined patterns of movement using uplands in summer which are cooler and away from insects and lowland sites in winter. In summer, when browse is abundant deer can travel over large areas, but in winter they congregate in low-lying river valleys or on the coast. Red deer are found in herds of about ten, with the largest being up to twenty one. In winter two thirds of their food is from trees (bark) and grasses. Red deer eat herbs and grasses in oak woods from May to September with a peak in May, June and August (Simmons 1996). It appears that hunters had two problems to deal with in the hunting of deer due to, a) the small size of the herd and b) the distance it travelled in the summer months. Hunters either had to travel long distances in the summer when the herds were dispersed over larger areas, which included the uplands, or they could attract deer by creating openings by the burning of vegetation which would bring the animals into an area of their choice, therefore, making a kill more predictable.

The palaeoenvironmental evidence from Britain for human interference in the landscape is not conclusive and much has been inferred by association. The evidence for human involvement in the firing found on Dartmoor is slight, as the evidence for Mesolithic settlement is limited to a few flint scatters and none has a direct association with the areas of burning (Caseldine and Hatton 1993). The difficulty is in distinguishing between fire caused by man or by natural events, such as lightning strikes. Rackham (1986) is sceptical about the burning of deciduous British woodlands without a high pine content and although Moore (1996) has challenged his views, she reiterates the dilemma of whether the presence of charcoal in prehistoric contexts was due to anthropogenic or natural fires and present research is unable to distinguish between these two events.

Mellars' work in the late 1970's (Mellars 1976) suggests that deliberate burning of woodland may have attracted game to clearings. Lewis's studies in Northern Alberta indicate that the firing of vast areas of the prairies was a common practice amongst native Indians, which allowed them to create the kind of environmental conditions that were favourable to their hunting strategies (Lewis 1982, 51). Although this may have been a common practice amongst native North American Indians, it is by no means proven for late Mesolithic Britain, but if it did occur it would have increased the potential for vegetation growth, in particular hazel (*Corylus avellana*) and studies of forest environments in Poland suggest this is the case (Simmons 1996). The spread of hazel, however, is well documented within the palaeoenvironmental record for the Mesolithic period and the idea that human induced fire was used to increase its potential for food, both for animals and humans has been put forward (Simmons 1996). However, Simmons' work at North Gill indicates that the pollen record shows no increase for hazel as a result of fire at the 'forest-scrub edge' and 'scrub-heath edge'. Elsewhere at North Gill there was a drop in woodland pollen and an increase in *Corylus* could be seen and Simmons points out that the general pattern in England and Wales is that although *Corylus* can be increased by as much as sixty two per cent during disturbance phases, it should also be recognised is that it can also diminish during disturbance phases as well. It appears, therefore, that the spread of hazel is by no means uniform, or even reliable. It is possible that deliberate and repeated firing may have accidentally reduced the amount of hazel, rather than increased it, or contributed to a deterioration in the soil, leading to the formation of heath (Simmons 1996, 141). This is something Mellars (1976) does not consider as a possibility when applying North American ethnographic evidence to a north European temperate climate. Edwards and Ralston (1984, 18) put forward another possibility, that it was the movement of hunter-gatherers which is reflected in the increasing migration of hazel that occurred through natural environmental conditions that were favourable to its expansion, rather than any anthropogenic interference, such as deliberate burning, that caused its expansion.

The use of fire as a woodland management tool, or as an aid for hunting, i.e. in driving game, is well documented, both in historical times and amongst modern-day hunter-gatherers (Mellars 1976; Lewis 1982; Simmons 1996). Domestic fires distribute fine charcoal into the atmosphere, some of which would fall as rainout and a low level of microscopic charcoal is frequently found in the peats of Flandrian II (Simmons 1996, 138). Although lightning fire cannot be ruled out, continuous human occupation where domestic fires are regularly lit could also cause background rainout (Simmons 1996, 139). Like Rackham (1986), Simmons (1996, 129) thinks the likelihood of fire in a deciduous woodland being started naturally is unlikely, except in a dry spring or times of drought, although Simmons (1996, 127) mentions twenty three lightning caused fires in the coniferous forests of the Galloway Hills, south west Scotland over two days. The palaeoenvironmental record does not solve the problem of whether firing was started naturally by lightning, or by humans, neither does it suggest how fire might have been used by hunter-gatherer communities, although several possibilities have been put forward above. The use of fire to drive game, either into water, into nets, or off cliffs will not show in the palaeoenvironmental record, but firing the woodland would incidentally bring an improvement to the grass and herb content and this would be attractive to animals. Whether fire was used to maintain an existing opening, or create new openings, this would still have an advantageous effect for the hunter, in increasing visibility and perhaps making a kill easier, provided that the fire did not completely destroy the vegetation around it.

In the palaeoenvironmental record the maintenance of an existing opening by hunters may not always show up differently from one that was deliberately created, unless fine resolution pollen analysis was carried out and it could be seen that the tree frequencies had dropped (Simmons 1996, 145). At North Gill, however, it can be seen that there were six years of selective opening of the forest canopy, but no evidence of local fire and only in a later recovery phase after sixteen years, was there evidence of fire (Simmons 1996 147). These two examples show the problems of trying to make positive interpretations from the palaeoecological record.

Generally, any forest in Britain would have had gaps in it in both the Boreal and Atlantic periods, as a result of natural processes. The optimum zone for animals to feed and drink, appears to be the area between the forest edge and open water (Simmons 1996) and although any disturbance effects by animals, or humans is likely to be seen in the pollen diagrams from these lakes, there is still no distinction between whether these openings were created by human or natural means. Evidence from Waun Fignen Felen, Wales, suggests there are disturbed areas that might have been grazed by deer, wild pig and aurochs (*Bos primigenus*). These animals could have also created an opening naturally by grazing, as well as keeping one open. North American studies have shown that it is possible for animals to ring bark trees, which would cause the eventual death of the tree. It is well known that beavers can make dramatic alterations to the landscape (Coles and Orme 1983) , but Simmons also suggests that storms are more likely than fire to cause woodland disturbance (Simmons 1996, 129).

The Atlantic forest, therefore, would have been a mosaic of forest, scrub, edge, water and wetland and it is highly possible that there would have been some kind of management by hunter-gatherers, either in creating or maintaining canopy openings by the use of fire, or the removal of branches. There would also have been large unmanaged areas, with the opening of canopies by natural processes, such as windthrow (Simmons 1996). By the end of the 5th millennium BP and the beginning of the Neolithic period there is less evidence for burning in the uplands that can be seen in the palaeoenvironmental record and Simmons suggests that woodland management by fire in the later Mesolithic may have altered with a change in economy by the Neolithic with a lessening desire to burn. Alternatively, if continuous firing of the uplands contributed to the paludification of the soil, this would also have had an effect on the local ground flora (Simmons 1996, 150).

The elm decline

In north west Europe, a decline in elm pollen to about half its former frequency can be seen in pollen diagrams from between 5300 – 5000 BP (Bell & Walker 1992, 160). The elm decline coincides with forest disturbance which has been attributed to human activity around the time of the Neolithic and it has often been suggested that it was Neolithic clearance that caused it (Rackham 1986) as elms grew on the better soils that were also attractive to early farmers (Edwards,1989, 149). Other arguments put forward include a deterioration in climate; contemporary changes in soil; human interference by the collection of leaves for fodder and Dutch elm disease (Bell & Walker 1996). Rackham suggests that most of the anthropogenic reasons that are put forward do not take into account the massive scale of the event. He suggests that elms covered one-eighth of Britain in the sixth millennium BP and there were not enough Neolithic people to have cleared or pollarded them on this scale. He does put forward the idea, however, that Neolithic clearance might have set up conditions that were favourable to increasing the spread of fungus by the bark beetle *Scolytus scolytus* (Rackham,1986, 246) and that these two events together may have contributed to the decline of the elm. Simmons makes the point that some forest disturbance shows the first occurrence in pollen profiles of *Plantago lanceolata* (plantain) a plant which has a liking for disturbed and open ground around the time of the elm decline (Simmons 1996.151). He suggests that if the elms had died from disease, they should have recovered within a few decades or centuries, as in modern examples, by shooting from the original rootstock or by seed germination. However, if the death of the elms had been coupled with a deterioration in the soil, they could not replace themselves so easily and this together with pollarding would increase their susceptibility to disease especially if their branches were also cut for fodder. (Simmons 1996, 220).

Pre-elm decline cereal pollen

It is often the case, however, that the elm decline coincides with evidence for the existence of cereal-type pollen, a reduction of woodland pollen, or an increase in herbaceous pollen or plants which favour disturbed ground and this has resulted in the theory that the start of agriculture is inter-linked with it (Edwards 1989, 149). However, Edwards and Hirons (1984) have studied the evidence for pre-elm decline cereal pollen as an early indicator for the use of domesticated cereal. There are difficulties in deciding whether large pollen grains from Mesolithic contexts are from cultivated cereal or large grained wild grasses and this identification can often be questioned (Moore 1991). Contextual associations can go some way to suggesting there might have been plant manipulation by hunter-gatherers prior to the traditional view of farming activity being contemporary with the elm decline in north west Europe. Rowley-Conwy (1995, 352) advises that there are no reliable archaeological dates that go back as far as some of the early pollen claims, for example at Soyland Moor and that it is, therefore, difficult to make farming earlier than the main Neolithic monument building horizon, which he puts around 5200 BP.

However, the recognition of cereal pollen or '*Cerealia*' in the palaeoenvironmental record is the most convincing evidence for some kind of cereal cultivation prior to the elm decline (Edwards 1989b). Edwards puts forward some of the problems that are associated with the identification of pre-elm decline pollen grains as well as the small numbers of grains, often only one or two grains, that are found in the microfossil record which affect interpretation. Drawing evidence from several authors, Edwards sets out the criteria he has used regarding the identification of pre-elm decline cereal pollen in a paper entitled 'The cereal pollen record and early agriculture' (Milles *et al.* 1989b). Edwards states that cereal or *Cerealia* pollen is derived from cultivated grasses, whereas 'cereal-type' pollen, which also morphologically corresponds to cultivated grasses, can also include some wild grass species. Cereal size has also to be taken into account and the accepted minimum size for the identification of cereal pollen grains is 37μm. Even when cereal pollen is found, it may not necessarily mean that its presence indicates the exact location of arable fields, because cereal pollen can travel short distances. Other problems with interpretation are that cereal pollen is produced in low quantities and it is normal for one grain only to be found in a pollen count of c.500. There is large morphological variability which makes identification difficult and sometimes samples may be contaminated, by downward smearing of the auger. Edwards suggests that if the cereal pollen identification is uncertain, other evidence must be sought for cultivation, such as weed or disturbed ground flora, but such evidence may not necessarily infer anthropogenic interference (Edwards 1989a). Edwards emphasises this point by stating that "archaeological evidence must be fully utilised in the interpretation of the palynological record". He also stresses that the interpretation of palynological data can be open to question especially where the question of human interference is involved (Edwards 1989, 143). These comments do not provide confidence for the palaeoenvironmental data, but urge caution when interpreting the results.

TABLE 2

NAME	DESCRIPTION
'cereal' or 'Cerealia'	pollen deriving from cultivated grasses.
'cereal-type'	pollen types which morphologically correspond to those of the cultivated grasses, but which could include some wild grass species.
'cereal-size'	any grass pollen rain with a diameter corresponding to an accepted minimum size for many cereal pollen grains, e.g. 37µm for grains treated with sodium hydroxide (NaOH) or potassium hydroxide (KOH), followed by Erdtman's acetolysis and embedding in silicone oil (Faegri & Iversen 1975). This category would also include some grains from wild grasses

Edwards' clarification of the definition of pre-elm decline cereal pollen (Edwards 1989b)

Edwards' work in Britain and Ireland has identified pre-elm decline cereal pollen grains from several sites in Britain and Ireland. He stresses that it is the cereal pollen grains themselves, as well as any woodland changes within the pollen source that can indicate possible early agriculture, but that woodland changes alone, may have occurred by natural events. Of the eight sites assessed (Edwards & Hirons 1984) pre-elm decline cereal grains were found stratigraphically below the elm decline levels and have a radiocarbon date range within the first half and the beginning of the second half of the sixth millennium BP, which is prior to the traditional date of the elm decline around 5300 – 5000 BP. For example, at Newferry, Co. Antrim a single pollen grain, which was difficult to identify, was not interpreted as indicating agriculture by the excavator. "A single pollen grain of cereal type" was found at Ballynagilly, Co. Tyrone, but it had associated woodland changes. At Weir's Lough, "four cereal grains" (which are assumed to be pollen grains of 'cereal-type') were associated with woodland changes and at Dolan, Co. Galway a "single large pollen grain of Gramineae" was found. At Cashelkeelty I, Co. Kerry, there was one grain of barley (*Hordeum* type) and two grains of *Triticum*-type pollen grains which suggested human interference of the woodland. In Scotland, at Machrie Moor, Isle of Arran, two pollen grains of *Hordeum* and "two possible cereal grains" together with an increase in weed taxa suggested human interference. At Soyland Moor D, Central Pennines, "cereal grains" together with taxa suggesting woodland changes were found and at

Rimsmoor, Dorset "two cereal pollen grains" were found associated with woodland changes that were suggested by the pollen record (Edwards & Hirons 1984). These sites together with woodland clearance could suggest the activities of early farming communities. Whilst the evidence for pre-elm decline cereal pollen at these sites individually may not constitute adequate evidence for early Neolithic activity, when viewed together and in association with woodland changes, they do suggest that some kind of human interference with the environment might have been taking place, either as a direct response by hunter-gatherers to a changing environment or social order, or by early farmers. Although Edwards' later work (1989) has increased the identification of pre-elm decline cereal pollen on a number of sites in both Britain and Ireland, this still does not solve the dilemma of which cultural group might have been carrying out this activity.

Simmons (1996, 76) is aware of the identification problems in separating pre-elm decline cereal pollen from wild grasses and also sets out criteria for evaluating the evidence. He suggests the grains of cereal pollen should be positively identified, and more than one grain of cereal pollen should be present. He also suggests that there should be no contamination and that the grains should also have vegetation disturbance in the form of weeds associated with it. Taking these criteria into account, it appears that Soyland Moor is the only upland site that fulfils all the requirements. At Soyland Moor the cereal-type pollen grains come from a profile with a radiocarbon date of 5820 $\pm$ 95 BP, with one grain being identified as *Hordeum* (barley). There is also a decline in the total arboreal pollen from forty per cent to thirty four per cent. There is a short phase of disturbance where plants such as *Plantago lanceolata* (plantain) and *Rumex* (dock) appear and this has been attributed to small areas used for agriculture (Simmons 1996, 77).

Simmons warns that we should be careful in interpreting every area of cleared woodland in the sixth millennium BP to the Mesolithic attempting to grow cereals, at the same time stating that absence of evidence does not necessarily mean that there were no cereals and suggests that it is highly possible that cereals were being grown in woodland openings from about 5800 BP onwards (Simmons 1996, 151). Although there are an increasing number of pre-elm decline cereal pollen grains being found on sites, there is not enough evidence found with direct archaeological associations and the pollen record and whilst the data tantalises us with possibilities, it is still open to varying interpretations.

Post elm decline activity

It is possible that late Mesolithic groups could have acquired the techniques and materials for cereal cultivation suggested by the *availability* phase (Zvelebil 1986). This does not imply settled agriculture throughout Britain. Edwards suggests that if the idea of pre-elm decline activity for the earliest agriculture is abandoned, then the earliest post-elm decline disturbance that is available in the both the archaeological and palynological record, might have come about as a result of hunter-gatherer activity, rather than that from early farmers. Edwards' work at the Howe of Cromar suggests Mesolithic use of the area, both before and after the elm decline. The site has a radiocarbon date of 5200 BP. In the post elm decline period, environmental interference can be seen in the pollen record by a reduction in tree pollen values, together with an increase of grasses, plantain and bracken. Although there are Neolithic monuments in the area, the radiocarbon date of 5160 ± 70 BP (4218-3792 cal.BC) (Edwards 1989, 150; Fairweather and Ralston 1993) for the Neolithic timber hall at Balbridie, approximately twenty five miles away, shows there is a chronological gap between the date of the timber hall and the date for the carbonised emmer wheat (*Triticum dicoccum*) found in association with the site (4745 ± 160 BP (3936 – 3030 cal.BC) (GU-1421).

Woodman (2000) points out that the earlier radiocarbon date from the timber may be due to an 'old wood effect' (Williams 1989; Baillie 1995) and that it may not necessarily date the construction of the hall. The dates also suggest that cereal cultivation in the area appears to be much later than the Neolithic monuments. However, the excavators (Fairweather and Ralston 1993, 320) indicate that the timber building and that grains of emmer wheat are contemporary, as the grain came from an internal feature within the structure (Discussed in Chapter 7). The presence of *Cerealia* pollen grains in the turves associated with the structure, together with the emmer wheat suggests that the disturbances seen in the pollen record in the area could be small-scale hunter-gatherer activity, rather than that of early farmers (Edwards 1989a, 150)

Edwards further suggests the existence of what has been described by Zvelebil (1986) and Dennell (1985) as a farming frontier where upland occupying hunter-gatherers may have had contact and exchange with lowland occupying early farmers (Edwards 1989, 152). Whilst this idea would fit into Rowley-Conwy and Zvelebil's *availability* phase and there is evidence of two distinct cultural groups using the area that can be seen from the Mesolithic microliths and the monuments of the early Neolithic, we do not know whether these groups overlapped in time, or indeed if the small scale woodland interference seen in the pollen record is either a) anthropogenic, or b) caused by hunter-gatherer groups at all. Edwards (1989, 152) in fact stresses the need for the archaeological evidence to be more closely linked with the palynological record in order accurately to interpret both data sets.

It has been suggested in the recent work of Simmons (1993), Caseldine and Hatton (1993) and Edwards (1993) that the repeated presence of charcoal in the palaeoenvironmental record might be attributed to human interference. Castledine and Hatton's work on Dartmoor shows that there is a remarkable coincidence of vegetational changes in areas where repeated burning has also been found. They suggest that there is a link between the formation of peat and areas of repeated burning in upland areas of Britain, for example on the North York Moors, the Pennines, the Lake District and Dartmoor. They suggest that fire was used by human groups to deliberately modify the landscape. They also suggest that the blanket peat formation that occurred in areas on Dartmoor in the 8th millennium BP was a direct result of waterlogging, which was caused by charcoal particles from woodland burning, which affected the permeability of the soil which had become clogged by these particles. In the palaeoenvironmental record, they found a close association between charcoal and reduced woodland pollen and interpreted the evidence as woodland maintenance by Mesolithic groups.

The two sites that were studied on Dartmoor were Black Ridge Brook at a height of 440m O.D. and Pinswell at 461m O.D. At Black Ridge Brook between 7700 BP and 6300 BP the microscopic charcoal record shows the effects of burning, after which time this ceases. The interpretation is that it was Mesolithic people who used the area intensively and then abandoned it after 6300 BP. At Pinswell, close by, but at a slightly higher elevation, the woodland cover is undisturbed at 7000 BP. By 6750 BP there is a rise in microscopic charcoal and the woodland cover is disturbed. The presence of *Melampyrum*, as a fire responsive taxon, suggested to Caseldine and Hatton that it was probably the local use of fire and grazing which prevented regeneration of the woodland. The sequence of events of vegetation change began with a transition from hazel woodland to blanket bog over the course of a thousand years (Caseldine and Hatton 1993, 130). Although there is indisputable evidence for the existence of repeated horizons of charcoal as a result of burning in the palaeoenvironmental record, what is not certain is that it occurred by human effort and both Simmons (1975) and Rackham (1980) have questioned the validity of such an interpretation without direct archaeological evidence. Throughout the study on Dartmoor, neither Caseldine, nor Hatton have referred to any association of Mesolithic artefacts and although the repeated presence of burning in the same area is probably most likely to have occurred anthropogenically, their statement that "the results clearly implicate Mesolithic communities" is pushing the data into a model without the essential supporting archaeological evidence. Mesolithic communities may well be implicated in this situation, but it is not enough to draw conclusions without any valid evidence to support it. At the present time, it is not possible to separate anthropogenic burning from that which occurs naturally and until a proven methodology has been devised to do this, human implication must remain conjectural.

However, the radiocarbon dates for the two sites, Black Ridge Brook and Pinswell (above) fall before the elm decline and before the pre-elm decline cereal pollen. This process, if caused by human intervention, could be seen as a continuing process of environmental manipulation, from the beginning of the early Mesolithic, through to the onset of farming.

Both Simmons and Innes (1987; 1988; 1996a) and Simmons (1979; 1996) believe that there was a "conscious economic strategy" carried out by Mesolithic hunter-gatherers in order to maximise the resource potential of the Atlantic-Sub-Boreal forest. Their studies of the upland areas of the North York Moors at sites such as White Gill, Broomhead Moor 5 and North Gill show repeated areas of burning prior to the elm decline, with White Gill and Broomhead Moor 5 having Mesolithic flint associated with it. For upland areas of northern England the pollen records show that there were few woodland changes, and Simmons and Innes (1987) postulate that this was probably due to there being sufficient resources available for early Mesolithic hunter-gatherer groups. By the later Mesolithic, because of the density of the deciduous forests and the reduction of game animals, hunting became more difficult. After 7500 BP when the rise in sea level caused loss of land, any increase in population levels would have put pressure upon the resources that were available. Simmons and Innes (1987, 397) put forward the idea that the hunter-gatherer response to this kind of pressure would call into being an "advanced foraging system" in which, deliberate burning would play a part in specifically selected areas that had a high resource potential. Initially, the use of fire may have had a beneficial effect, but continuous firing of the landscape may have eventually prevented recovery, to such an extent that it might even have accelerated the degradation process of changing upland woodland into blanket bog and heath. The economic resource base, therefore, would become reduced by over-exploitation and this is seen in the greater number of flint scatters and areas of woodland disturbance in the later Mesolithic period (Simmons 1996).

Discussion

Cohen's proposition (1977) that hunter-gatherers would only adopt a more complex social organisation if they came under stress would answer Simmons' question and put forward the suggestion that it was the inability of the resources from the Atlantic forest to adequately feed the Mesolithic population. By interfering with their environment hunter-gatherers were trying to maintain a balance between the resources that were available and, either a growing population, or because of cultural preferences. In maintaining this balance it does not necessarily mean that the population was in fact increasing, but the situation could have been such that resources became increasingly difficult to obtain, due to the density of the Atlantic forest between the eighth and sixth millennium BP. Cultural preference may have also played a part in the choice of resources and any over-specialisation may have caused a diminution or over-exploitation of that particular resource.

In order to maintain a balance of resources against a changing environment and climate, hunter-gatherers in Britain may have been forced to adopt new economic strategies in order to survive. The rising sea level from about 8600 BP meant a loss of land and hunting territory and with it came a more oceanic and humid climate. Mesolithic hunter-gatherers had to adapt and adjust their food procuring strategies from as early as the Boreal period (9000 BP) when there was rapid vegetation change throughout Flandrian I. This process of adaptation and change may have been a continuous process, even before, but certainly throughout, the Mesolithic period and it may have been the ability to develop different subsistence strategies as and when required, that enabled hunter-gatherers to survive for so long. It may have been this ability to adapt to a changing situation, that enabled them to resist farming until the end of the sixth millennium BP in Britain when it was only, as suggested by Bryony Coles (1998), rising sea level which may have brought hunter-gatherers and farmers closer together, either in competition for food or territory, that caused a final change in economy.

Although there appears to be increasing evidence throughout Britain for early cereals in the form of pre-elm decline cereal pollen, the interpretation of this evidence for early agricultural activity is by no means conclusive, although Simmons (1996) suggests that it was quite likely that cereals were being grown in cleared woodland areas from about 5800 BP onwards. There is increasingly both archaeological and palynological evidence which strongly suggests it is likely that this is the case, but until that evidence becomes incontrovertible, although we can regard it as distinctly feasible, it may be only one of several possibilities. The possibility of repeated burning in upland areas of Britain also strongly suggests that humans were interfering and altering the landscape, but again until it is conclusively proven, it has to remain as speculation. Although Edwards is highly cautious in assigning any environmental interference to humans without specific archaeological evidence to corroborate it, he does concede that where there are sites with both a macrofossil record and archaeological evidence that complement one another, it is reasonable to assume that this indicates man's intentional use of his environment (Edwards 1984, 30).

Social complexity is not so easily seen in the archaeological record in Britain, but the intention of hunter-gatherers to bury their dead with grave goods also suggests some sort of social hierarchy and organisation. In Britain we do not have cemeteries on open sites like that at Skateholm in Scania, S. Sweden (Larsson 1989), but we do have important burial sites in the caves on Mendip, Somerset (discussed more fully in Chapter 5).

At Aveline's Hole, Burrington Combe (Davies 1921; 1922; 1925) there is a multiple burial site, with possible grave goods, which includes dates on the human bone of 9090 ± 110 BP (8554-7967 cal.BC) (Q-1458) and 8100 ± 50 BP (7302-6864 cal.BC) (GrN-5393) (Tratman 1977). The most complete human skeleton is 'Cheddar Man' from Gough's (New Cave) Cheddar, with a date of 9080 ± 150 BP (8686-7827 cal.BC) (BM-525) (Davies 1904). Human bone was recovered from the swallet hole at Totty Pot, Cheddar in the 1960s, where there was an estimated minimum number of four individuals, including a child (pers. comm C.J. Hawkes). Little of this bone survives, but a radiocarbon date of 8320 ± 69 BP (7541 – 7086 cal.BC) (Unpublished) from a femur, places it contemporary with the youngest date from Aveline's Hole (pers. comm. C.J. Hawkes). Further evidence for Mesolithic burial in Britain is fragmentary and the data we do have from the above sites has not been recovered well enough to be able to say conclusively whether these burials suggest some form of social hierarchy or not. However, the possible grave goods from Aveline's Hole, which include perforated animal teeth and perforated winkle shells (Davies 1925, Jacobi 1982 and the possible association of the bâton de commandement with 'Cheddar Man' (see Chapter 5) suggest that certain people were important enough to have been buried with specific artefacts.

In Britain hunter-gatherers may have been socially complex, but were still highly mobile and there is no reason to expect that the behaviour of the Mesolithic in Britain mirrored that in north west Europe. Britain's diverse topography and island isolation from the Continent certainly suggests otherwise. The possibility that hunter-gatherers in Britain were socially complex in their ability to alter their landscape is attested by the above evidence, possibly in order to maintain a balance between the available resources and the population. Hunter-gatherers may have been economically successful for thousands of years at maintaining this balance, but environmental fluctuations around the time of the transition at the end of the fifth millennium BP, may have been sufficient to unbalance the local habitat making it unsuitable either for hunters or favourable to early farmers. Baillie's recent work on tree-ring chronologies has shown increasing potential for the reconstruction of past climate. Laboratories at Belfast and in Germany have experienced difficulties in constructing a chronology at the end of the fifth millennium BP and Baillie suggests that this might be due to some sort of environmental pressure (Baillie 1995,147).

If the deciduous forests by the late Mesolithic were so dense that game was more widely dispersed than before, making hunting difficult, as suggested by Simmons and Innes (1987) any increase in population would have increased the pressure upon resources and any specialisation, through cultural preference, would have narrowed the resource base even further. If as Coles suggests (1998) social boundaries were created between hunter-gatherers and farmers, this may have restricted the size of territories and created competition within the landscape. Simmons and Innes (1987) suggest that this situation can be seen in the greater number of flint scatters and areas of disturbance that are found in the later Mesolithic period. If late Mesolithic hunter-gatherers were, therefore, not able to live below the carrying capacity of the Atlantic forest as ethnographic studies suggest (Cohen 1997; Lee & de Vore 1968) they would have been forced to change the way they obtained their subsistence base.

If there were changes in the climate or the environment that were sufficient to affect the resources available, this may have been enough to tip the balance towards either economic or social change. If hunter-gatherers had difficulty in coping with a constantly changing environment, a new social order and a more predictable economy might have seemed advantageous enough to prompt the take-up of agriculture and although the social complexity of hunter-gatherers may have enabled them to resist farming for a certain length of time, it may also have enabled them to adopt, fairly rapidly, new techniques when the situation demanded it. If the use of fire had initial beneficial effects, it may also have eventually undermined the economic base once the degenerative processes began, such as soil erosion and peat formation in the uplands, which may have set a trend in motion that was irreversible. Social complexity may have worked in two ways: on the one hand it may have initially held up the onset of farming, but on the other, its very nature may have threatened the stability of what may have initially appeared to be economically beneficial. If the Ertebølle were stable enough to be sedentary and living on specialised food preferences, this specialisation in favoured areas, such as oyster catching, may have in fact made them not only more vulnerable to failure, but also vulnerable to the take-up of farming when that resource failed (Simmons and Innes 1987).

We do not have enough conclusive evidence in Britain, either from the archaeological or palaeoecological record, to be able to say that it was social complexity that either held up the take-up of farming in the sixth millennium BP or enabled its rapid adoption by the fifth millenium BP. Mesolithic hunter-gatherers would have been extremely familiar with the landscape and environment within which they lived and it does seem inconceivable that they did not have the capability or the technology to alter or manipulate it as they chose, although this is not always obvious in either the palaeoenvironmental or the archaeological record.

The above discussion has centred entirely upon what the palaeoenvironmental record has been able to suggest regarding the economic processes in the late Mesolithic and this may have been only one part of the transition process. If hunter-gatherers were in a vulnerable position, either through stress on food resources, or diminishing territory, a new ideology and social order, together with new economic techniques may have appeared more favourable. We should not lose sight of the fact that the Neolithic brought not only a new economy, but a new ideology and it is both these options that may have appealed to a struggling hunter-gatherer society at the end of the late Mesolithic period. The palaeoenvironmental evidence suggests that the Mesolithic-Neolithic transition may have only been the final stage in what Simmons describes as "the evolution of landscape, ecology and land use of the entire Holocene" (1996, 223).

CHAPTER 5

THE MESOLITHIC IN SOMERSET

Introduction

This chapter will discuss the archaeological evidence for the Mesolithic period in Somerset. The recovery of data for the Mesolithic period is uneven in the south west peninsula, with Somerset having the most comprehensive assemblages, together with a greater number of excavated sites. In Devon, the evidence is variable and fragmentary and much of the Cornish evidence comes from surface finds, with few excavated sites. There are few radiocarbon dates available for either Devon or Cornwall. For the purpose of this thesis, it was decided to concentrate on the county of Somerset and in particular North Somerset where primary research was carried out. Somerset has better documentation than other counties in south west England and it is an area where more extensive archaeological research has taken place in the past.

In the 1970's the Somerset Levels Project was actively involved in collecting, recording, excavating and monitoring the wetlands of the Somerset Levels, which resulted in the publication of the Somerset Levels Papers. The University of Bristol's Spelaeological Society (U.B.S.S.) has been an active research group on Mendip throughout the last century. The Committee for Rescue Archaeology in Avon, Somerset and Gloucestershire (C.R.A.A.G.S.) was active in Somerset in the 1970's. Many amateur workers have fieldwalked and collected flint from Mendip and throughout the county, some of which is held by the museums at Taunton, Wells, Axbridge, Woodspring, Cheddar and the U.B.S.S. Flint is also held in private collections. The flint collections held in Wells, Axbridge, Woodspring and the University of Bristol Spelaeological Society's museum relating to North Somerset were assessed and the results are discussed below. (see Appendix).

The North Somerset Flint Collections

In North Somerset previous excavation has been carried out at Lower Court Farm, Long Ashton, Freeman's Farm, Felton, Hay Wood Cave, Hutton, Weston-super-Mare, Sandford, Winscombe and Birdcombe, Wraxall (1955). The remainder of the flint held in the museums in North Somerset has been recovered from fieldwalking and isolated finds. The material from Blackstone Rocks, Clevedon (ST384703) is on display in Woodspring Museum and includes worked flint from the Upper Palaeolithic, Mesolithic and Early Bronze Age (Sykes 1938). Of the five microliths, four are from the later Mesolithic period and include a crescent, a rhomboid and two elongated triangles. Blackstone Rocks is a site on the intertidal zone that is accessible at low tide. Sykes (1938) felt that the microliths from Blackstone Rocks were out of place with the rest of the flint collection, which was Upper Palaeolithic and Early Bronze Age.

At Lower Court Farm, Long Ashton (ST551702) Alan Saville described the flint collection as having a "significant Mesolithic aspect" in a publication of Bristol and Avon Archaeology, 1986, No.5. The raw material is a dark, honey-coloured flint which includes some microliths. This particular raw material dominates the collection. Chris Richards (pers. comm.) has suggested that it derives from the Avon Gravel terraces at Shirehampton and Pill, but the writer is of the opinion that it is too dark for the Chapel Pill gravel (ST540765).

Freeman's Farm, Felton (ST519669) was fieldwalked in 1992 by the University of Birmingham Unit. Subsequent trial trenches indicated that the depth of soil was only 30cm and full excavation would not be worthwhile as there was plough disturbance. The flint consisted of mainly Neolithic with some Mesolithic and included a scatter of microliths.

Hay Wood Cave, Hutton, Weston-super-Mare (ST353582) was published by Everton and Everton in 1972. Late Mesolithic flint is on display at Axbridge Museum, but a small number of straight backed bladelets (rods) are not on display. This is a multi-period site and the stratigraphy is not always clear, but the microliths are similar in typology to that from Birdcombe, Totty Pot and Gorsey Bigbury (see Chapter 6).

Sandford Hill, Winscombe (ST412 590) was excavated by members of the U.B.S.S. and is unpublished. The flint collection in the U.B.S.S. museum contains fragments of worked rock crystal, which is not indigenous to the site, together with one microlith. The excavators suggest the debitage could be Mesolithic, but it is difficult to classify flint that has not been retouched.

Elsewhere in North Somerset evidence of the Mesolithic is seen in isolated surface finds, or small scatters, that are often mixed with later material. The quantity of material suggests that Mesolithic hunter-gatherers were active along the present coastline between Weston-super-Mare and Portishead, together with the higher ground of the Failand Ridge north of Birdcombe towards the Avon Gorge. There are a few scatters around the Barrow Gurney area (Freeman's Farm), but little or no evidence on the lower ground north of the River Yeo (Fig. 28).

Woodspring Museum also holds a large quantity of the Purchase Collection from fields around Charterhouse-on-Mendip (ST495555). Unfortunately the flint is unprovenanced and does not relate to Purchase's field drawings. All that can be said is that the area around Charterhouse-on-Mendip was extensively used by hunter-gatherers.

Axbridge Museum holds the Ann Everton collection which is well documented and provenanced. Flint was collected from fieldwalking and surface finds from Ebbor Gorge (ST505508) when the top of the gorge was de-turfed. Although there is no exact provenance for individual finds, there is a general prehistoric presence in the area which includes a microlith and later Neolithic phases. In 1986 further fieldwalking in the Callow Hill area produced a large quantity of flint which included micro-cores, small cores, backed blades and blade end scrapers. The museum also holds the Brian Hack collection which includes a large number of unmarked and unprovenanced boxes, which suggests a hunter-gatherer presence in Abbots Leigh (ST550740), Ebbor Gorge and Tower Hill (ST563498). The Purchase Collection from the Charterhouse fields is also unprovenanced, but includes one microlith and cores. Finds from the Hay Wood Cave excavation, including the microliths are on display.

The U.B.S.S. collections included Rowberrow Cavern (ST460579), but no microliths survive due to World War II bombing of Bristol Museum where the U.B.S.S. collection was housed. It is a multi-period site (Taylor 1920-21, 1924, 1926), but Taylor recovered 15 "pygmy" flints from the excavation at Rowberrow, seven of which are illustrated and some were found on the spoil heap (Fig.12). Of those illustrated B, C, D, E are elongated triangles, G and F are triangles and A is described as "a pygmy flake with a perfectly-chipped oblique" (Taylor 1926, 201). Taylor classifies the flints as Tardenoisian, but suggests they have to be late Neolithic or Bronze Age because of their stratigraphic position, which was close to Beaker fragments. Although the microliths are no longer in existence, the illustrations suggest they belong to the later Mesolithic period.

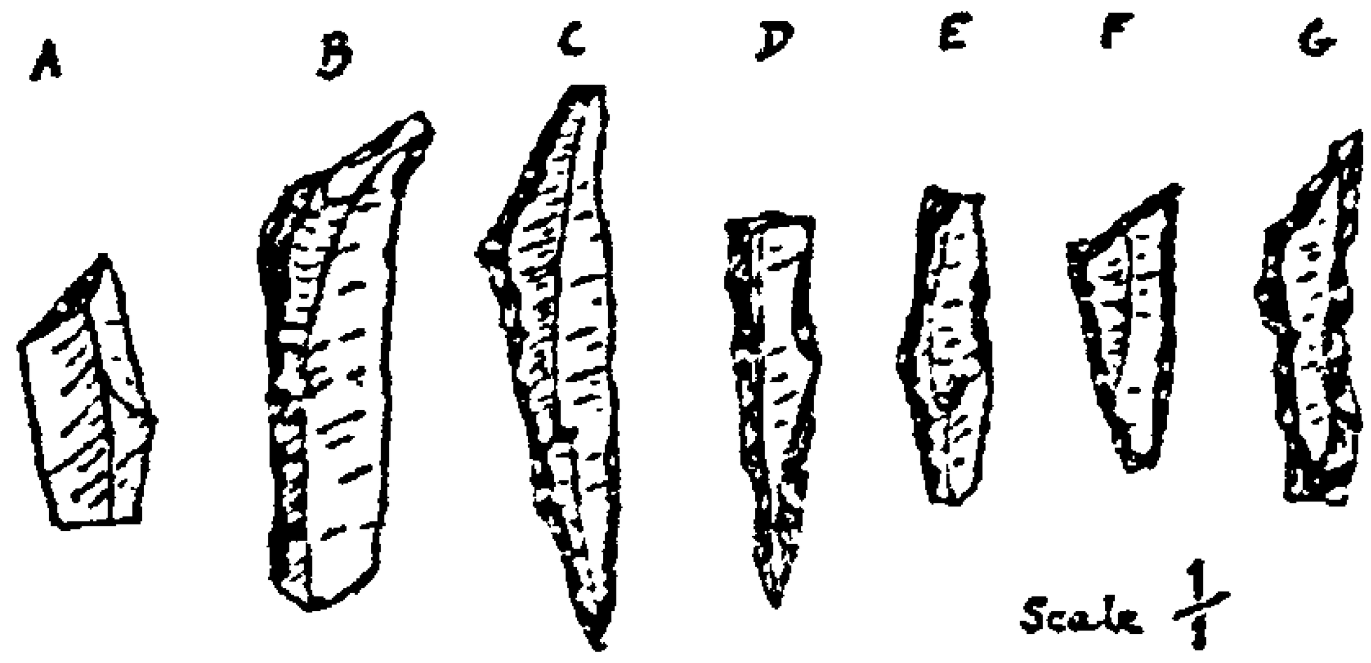


Fig. 12 Microliths from the Rowberrow Cavern excavation (Taylor 1926)

The microliths recovered from excavation of the henge at Gorsey Bigbury in a Beaker burial context (Jones 1938) were also lost in World War II (Wymer 1977) and are discussed further in Chapter 6.

Wells Museum also has flint from the Ann Everton collection which includes micro-cores, a denticulate and a microlith from Ebbor Gorge, together with later flint from the Neolithic to the Bronze Age. Also from Ebbor Gorge (not Ann Everton's collection) are non-geometric microliths. The Cooper collection contains early Mesolithic tranchet arrowheads and a Horsham point from Cheddar Head. The Hawkes' collection includes Mesolithic flint from Priddy (ST515512) and Westbury-sub-Mendip (ST510490).

Joan Taylor carried out extensive fieldwalking as part of the Priddy Plateau Survey (Taylor and Smart 1977) and excavation work at Lower Pitts Farm (ST538502) (*P.S.A.N.H.* 1977, Vol.121, 109; 1978, Vol.122, 120; 1979, Vol.123, 85; 1980, Vol.124, 119; C.R.A.A.G.S. 1975, 18; 1976-77, 14-15; 1978-79, 16-17; 1979-80, 13-14). Excavation and fieldwork showed a Mesolithic element within a mixed assemblage. Excavation revealed what was interpreted as a 'burnt Mesolithic structure', which is entered on the Sites and Monument Record No. 23965. The flint was not available for inspection and is believed to be lost (J. Taylor, pers. comm.). A radiocarbon date of 3050 ± 80 BC (uncalibrated) was obtained from burnt material relating to the hut. The excavation of the burnt structure has never been published and the writer suggests that the reason for this is that the hut was misinterpreted. There was considerable disturbance around the site by ploughing and much of the flint from the excavations and surface collection was rolled.

Flint from Wright's Piece, Nordrach, Mendip (ST528550) (Tratman 1956-7, *P.U.B.S.S.* Vol 8 (1), 46-47; Williams 1984) recovered from fieldwalking has a Mesolithic element. Trial trenches at Wright's Piece as part of the research for this thesis was undertaken, but no flint was recovered and no evidence of a "floor of dark earth with burnt clay or daub" was found as suggested by Williams in the Axbridge Archaeological and Local History Society News Sheet No. 74, October 1983, 2.

The flint collection from the 1995 excavation at Birdcombe is held by Taunton Museum. The archive and finds from the 1997 excavation are held by the writer, but will be deposited with Taunton Museum when research on the site is concluded.

The flint collection and finds from the 1960's Totty Pot excavation is held by C.J. Hawkes. The archive and flint from the 1998 excavation is the property of the Marquess of Bath and is currently held by the writer. It will be deposited in the Cheddar Caves Museum.

Mendip caves

Throughout Britain there is very little evidence for Mesolithic burial. There are caves and rock shelters on Mendip which contain Mesolithic flint from occupation such as Rowberrow Cavern (ST581459) (Taylor 1926) and Hay Wood Cave (Everton and Everton1972), as well as burial evidence from Aveline's Hole, Burrington Coombe (ST476587) (Davies 1920-21), Gough's Cave, Cheddar (ST467539) (Davies 1904; Tratman 1975; Stringer 1985) and Totty Pot, Cheddar (ST482535) (Barrington and Stanton 1970).

Hay Wood cave is a multi-period site where flint, human bone, animal bone and Iron Age and Romano-British pottery was recovered (Everton and Everton 1972). The flint includes microliths from the later Mesolithic period (see Chapter 6). Recent analysis on the human bone from Hay Wood cave has produced an early Neolithic date of 4860 ± 65 BP (3773 – 3520 cal.BC) (OxA-5844) (Richards and Hedges 2000). The presence of microliths suggests there was late Mesolithic activity in the cave. However, the stable isotope analysis has produced bone collagen $\delta^{13}C$ values of –20.8 which indicates a mainly terrestrial diet (Richards and Hedges 2000, 892). Both Mesolithic and Neolithic people were using Hay Wood cave, but it was the Neolithic groups who were using it to bury their dead. The isotope analyses by Richards and Hedges (2000) show that there is no evidence after 5400 BP on coastal or inland sites for a marine diet and even coastal cave sites have terrestrial $\delta^{13}C$ values.

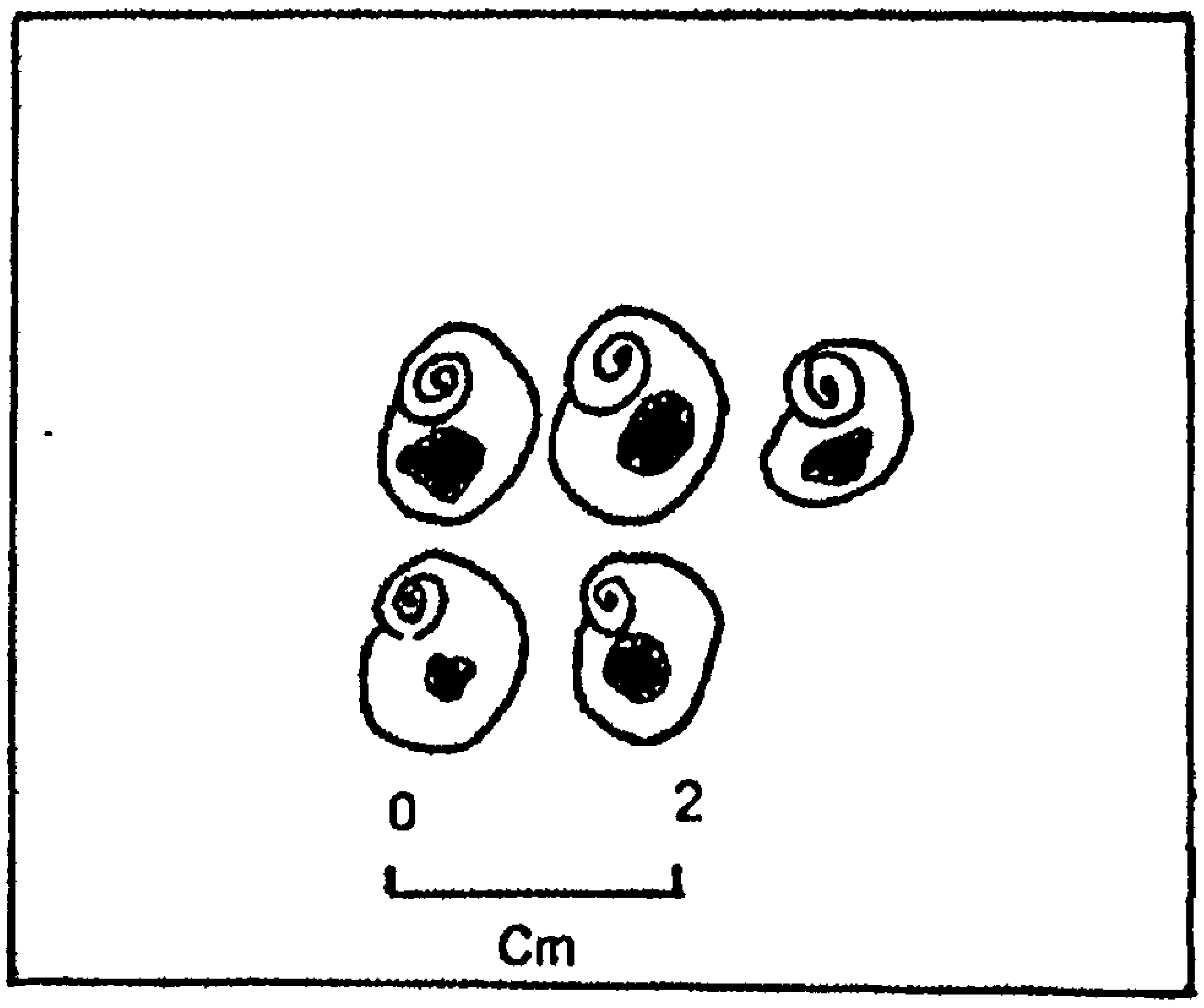


Fig. 13 Perforated winkle shells (*Neritoides obtusatus,* Linn) from Aveline's Hole, Somerset (after Davies 1920-21, 73)

At Aveline's Hole, Burrington Combe (Plate A) there is a multiple burial site, with possible grave goods, where an estimated fifty to a hundred skeletons were recovered from the cave between 1797 and 1840. There are two dates on the human bone of 9090 ± 110BP (8554 –7967 cal.BC) (Q-1458) and 9144 ± 110BP (8684 – 8028 cal.BC) (BM-471), together with a third date from stalagmite inside a skull of 8100 ± 50 BP (7302 – 6864 cal.BC) (GrN—5393) (Tratman 1977; Jacobi 1977; 1982). Associated with the burials and interpreted as being contemporary with the bones, were a large number of perforated winkle shells (Fig. 13) that were probably used as a necklace (Fawcett, 1920-21, 82; Davies 1920-21, 59), together with a double-rowed six barbed point (Davies 1920-21). Little of the skeletal material survives today (Jacobi 1982) as most of it was destroyed in World War II. Aveline's Hole also contains evidence of Upper Palaeolithic activity, but the above dates suggest it was being used for burial in the Mesolithic period. Hunter-gatherers either acquired the winkle shells themselves from the coast, or had connections with groups living near the sea.

Human bone has also been recovered from the swallet hole at Totty Pot, Cheddar in the 1960's, where there was an estimated minimum number of four individuals, including a child (Plate B). Little of this bone survives, but a radiocarbon date (unpublished) of 8230 ± 60 BP (7541 – 7086 cal.BC) from a femur, places it at the end of the early Mesolithic period (pers. comm. C.J. Hawkes). Late Mesolithic flint was also recovered from the swallet hole and this is discussed in more detail in Chapter 6.

The most complete Mesolithic human skeleton in Britain is 'Cheddar Man' from Gough's (New Cave) Cheddar, with a date of 9080 ± 150 BP (8554 – 7967 cal.BC) (BM-525) (Davies 1904; Stringer 1985). 'Cheddar Man' was discovered in 1903 during building work to the entrance of Gough's Cave and is the skeleton of a young adult male (Parry 1928). Subsequent excavation near the area of 'Cheddar Man' in 1986 recovered artefacts such as the bâton de commandement made of reindeer antler (Stringer 1986; Currant *et al.* 1989), bringing the total of these implements from the cave to three (Parry 1928). Their function is unknown and the context of these finds can only suggest that they were associated with the burial, rather than being regarded as a deliberate deposit of grave goods.

In 1998 DNA was extracted from the tooth of 'Cheddar Man' and matched with a living descendant, Adrian Targett from Cheddar who was the first link to be found (Barham 1999). This link has implications for the *indigenist* argument, rather than the 'wave of advance' replacing the indigenous population.

The dates from the three cave sites suggest that Aveline's Hole and Totty Pot were in use at around the same period, with Gough's Cave having an earlier occupation phase. However, the microliths found at Totty Pot suggests a much later Mesolithic presence than the radiocarbon date of 8320 ± 69 BP (7541 –7086 cal.BC) implies. The caves had been used for burial over several millennia in the early Mesolithic period and appear to go out of use from around the beginning of the 7th millennium BP. The microliths from Totty Pot suggest that the swallet hole still had a function at the end of the Mesolithic period, although the archaeological evidence does not tell us why there appears to be a gap of two thousand years between the burial evidence and the tool typology. Very little debitage was recovered from inside the swallet hole which could suggest that the microliths were deliberately deposited in the cave, rather than flint knapping having taken place either inside or around the swallet hole entrance. It is also not known why both Aveline's Hole and Gough's Cave should cease to be used for burial, when both caves had been used for several thousand years previously, from the Upper Palaeolithic period.

Apart from the burial evidence, there are few open sites that suggest permanent or even temporary occupation in the Mesolithic period on Mendip. The uplands appear to have been used for hunting rather than settlement and although a large quantity of flint has been recovered, either through fieldwalking or isolated finds, it can only tell us that hunter-gatherers were using the landscape on a temporary basis which was probably part of a seasonal territory that had links to sites on the lowlands (Chapter 6). The paucity of palaeoenvironmental evidence for Mendip makes it difficult to reconstruct the local environment in the Mesolithic period, although the animal bone recovered from caves can help in interpretation (Jacobi 1982b).

Somerset Levels

Early Mesolithic flint has been recovered from the Somerset Levels, where the higher ground of the Burtle Beds provided accessibility for the rich wetland resources that were available to hunter-gatherer groups. Wainwright's assessment of two sites at Shapwick and Middlezoy indicates a non-geometric industry with obliquely blunted points of the early Mesolithic (Wainwright 1960). Norman's work at Greylake, Chedzoy and Greenway Farm, North Petherton also suggests an early Mesolithic presence (Norman 1975; 1982). The recovery of hollow-based points from the Chedzoy site suggests a link with the Horsham industry in the south east of England, but see Chapter 6 and Norman 2001 forthcoming.

Fieldwork and excavation from The Shapwick Project (1988-1999) (Aston *et al.* 1988 -1996) suggests a prehistoric presence in the parish of Shapwick (ST421401), but no re-touched tools to suggest a late Mesolithic presence, although excavation from the Burtle Beds, mentioned above, indicates that the area around Shapwick was extensively used in the early Mesolithic period (Clark 1933; Wainwright 1960; Norman 1975; 1982). There does not appear to be evidence for the late Mesolithic period on the Somerset Levels, but this may be due to taphonomic processes. The small geometric microliths that represent the later period are often only recovered from excavation. and are rarely found fieldwalking or as a surface find because of their small size. Unless there were environmental reasons for preventing access to the Levels, i.e. inundation, it seems inconceivable that this would not have been an area rich in resources as it was in the early Mesolithic period and extensively used by hunter-gatherers.

The Sweet Track

The early dates for the Sweet Track and the Post Track (Hillam *et al.* 1990) throws into question the interpretation surrounding the cultural group that was responsible for their construction. The Sweet Track is one of the earliest Neolithic monuments in this country, having a calendar date by dendrochronology of 3806/7 BC (Hillam *et al.* 1990). This trackway (Plates I and J) was constructed to cross an area of wet, swampy ground over a distance of 1800m between the higher, drier ground of the Shapwick Burtle in the south and Westhay island in the north (Coles and Coles1986). The Sweet Track has been interpreted as a Neolithic monument, but it was constructed not only upon a well managed landscape, but it overlays an earlier trackway called the Post Track, parts of which were re-used to build the Sweet Track (Coles and Coles 1986). The Post Track has a calendar date by dendrochronology of 3838 BC (Hillam *et al.* 1990, 212), which suggests that the wood used in its construction was felled about a generation before the construction of the Sweet Track.

The implications of this are threefold. First, as parts of the Sweet Track were built using oak and coppiced hazel, the builders would have to have been in the area some years prior to its construction. Second, if the builders of the Post Track were the same group as the builders of the Sweet Track and they were using the Somerset Levels a generation before the Sweet Track's construction, as suggested by the dendrochronology dates, this would put the Sweet Track as the earliest Neolithic monument in Somerset. The only other site with a secure date from the south west peninsula is the Hembury causewayed enclosure in Devon with a date of 5280 ± 150 BP (4450 – 3700 cal.BC) (Table 6). Third, the question arises as to exactly which group was building the trackways. Although the jadeite axe, the pot of hazel nuts and leaf shaped arrow heads recovered beside the Sweet Track have been interpreted by Coles and Coles (1986) as being Neolithic, we have no other evidence from the Somerset Levels to suggest that the trackway builders were either sedentary, or farmers. Perhaps they were a hunter-gatherer group that were still in existence at the time of Neolithic monument building (see Chapter 7), or a mobile farming group that had a lifestyle that involved hunting, the use of pottery and had contacts abroad that enabled them to acquire polished stone. Leaf shaped arrowheads have been found beside the Sweet Track and from the Levels generally

(Coles and Coles 1986) and the recovery of the Meare Heath Bow dated to 4640 ± 120 BP (3653 – 3020 cal.BC) (Q-646) (Clark 1986) suggests that hunting may still have had importance for people using this area, although the large quantities of leaf shaped arrowheads found at Crickley Hill and Carn Brea, again suggests that there was a certain amount of warfare in the Neolithic period. It is believed, however, that the Meare Heath bow was deliberately broken before being deposited in the marsh (Clark 1963), but if this is the case, it may still suggest the significance of hunting in society. The difficulty seems to be in trying to distinguish between which cultural group is responsible for the activities that we can see in the archaeological record around the time of the transition.

There is no evidence for settlement on the Somerset Levels in the Neolithic period, either on the higher ground of the Sand Burtles or the Polden Hills. This may be a taphonomic problem, or it may suggest that the groups using this landscape were still mobile. The continuing inundation of the estuary may have meant that the people using the resources from the Levels had their settlements outside the resource area.

East of the Somerset Levels on higher ground is Wells (ST550453). Mesolithic flint has been recovered during excavations at Wells Cathedral. Although the excavators indicate that much of the flint was derived from disturbed contexts there is general evidence of Mesolithic activity in the area (A. Saville pers. comm.).

In west Somerset, Hawkcombe Head lies on the coastal edge with Exmoor at a height of 410m OD (SS844458) It is situated at the top of a combe above a spring-head. A large quantity of flint has been collected over a wide area around the spring-head and includes predominantly pieces from the later Mesolithic (Norman 1982, 20). The raw material comprises beach pebble. Porlock Beach is only 3km at the bottom of the combe and would be an easy source for raw material. There are submerged forests at Minehead (SS989471) (Boyd Dawkins 1872) and Porlock Weir (SS870480) (Wymer 1977) where flint from the Mesolithic period has been found. These forests would have been in a dryland location at the beginning of the Mesolithic period, but became submerged when sea level rose at the beginning of the Holocene. The flint flakes found by Boyd Dawkins in the 19th Century (SMR No.33942) are evidence of their use by hunter-gatherers prior to sea level rise. The same group may have been using the combe above the beach for hunting with a temporary camp at the top at Hawkcombe Head.

Discussion

Evidence for the Mesolithic in Somerset comes from a variety of contexts and topographical locations and although there is an abundant body of evidence for Mesolithic activity, much of it is confined to flint scatters, isolated and often unprovenanced stray finds with few radiocarbon dates. The wide range of topographical locations suggests that all areas of Somerset were being used in the Mesolithic period, although the findspots shown on Fig. 28, for the North Somerset area, highlight concentrations that dominate the upland areas and the north west Somerset coastline. This north Somerset coastline and the Failand Ridge, with Birdcombe on the south facing slope on the spring-line above the alluvium, suggests that this was a key area for hunter-gatherer activity in the Mesolithic period.

The low lying moors of the North Somerset Levels between the Failand Ridge and the Mendip Hills, together with the Somerset Levels are areas that were liable to constant flooding in the prehistoric period, both from the rise is sea level and from run-off from the surrounding hills. As a result of this, deposits of estuarine alluvium and peat have been laid down. There are probably many Mesolithic sites covered by several metres of alluvium that will never be discovered and it is only due to the extensive peat cutting in the 1970's on the moors south of Mendip that much of the archaeology has come to light (Coles and Coles 1986). It seems implausible that there are not more sites of the quality of Birdcombe that probably acted as a more permanent gathering place in the Mesolithic period, that are close to the spring-line on slightly higher ground above rich wetland resources, from which hunting groups could reach the higher ground of Mendip in the summer (see Chapter 6).

The evidence from the Mendip caves suggests that they were used primarily for burial in the Mesolithic period, but that the Mendip plateau was extensively used for hunting, rather than temporary or semi-permanent occupation.

Although the archaeological record may be uneven for the North Somerset and Somerset areas, the few high quality sites that have been discovered, such as Birdcombe, Hawkcombe Head and Chedzoy, together with the Mendip cave evidence can provide a sufficient model for future research.

CHAPTER 6

PRIMARY DATA COLLECTION

Excavation of two Mesolithic sites in Somerset

Introduction

Past studies of the Mesolithic period have focused primarily on flint collections and artefact recovery, with little emphasis on the need for environmental assessment to supplement the lithic evidence. Although more recent work has focused on systematic fieldwork and environmental sampling (Mellars and Dark 1998), much of our research around the time of the transition has either been inadequate or fragmentary because of a limited database. Our prospection and fieldwork strategies have not been sufficient to discover new evidence and European analogies are unable to produce satisfactory models for late hunter-gatherer activity in Britain.

Although there is an abundant body of evidence for Mesolithic activity in south west England most of it is confined to flint scatters and isolated and often unprovenanced stray finds (see Chapter 5). There is, therefore, a range of evidence to suggest that post-glacial hunter-gatherers were using different elements of the landscape from both upland and lowland locations as well as burying their dead in caves and swallet holes on Mendip. Further evidence for Mesolithic burial in Britain is fragmentary. For example, there are fragments of a humerus from Thatcham, Berkshire; a humerus from Paviland, West Glamorgan; fragments from Kent's Cavern, Devon; fragments from Badger Hole, Mendip, Prestatyn, Clwyd, Three Holes Cave at Torbryan, Devon and a possible Mesolithic skull from the river Yare, Strumpshaw, Norfolk. In Scotland there are some human remains from Oban and Argyll (Wymer 1991). Although a small collection of head and foot bones were found in the Oronsay middens, in particular from Cnoc Coig, they are not thought to be deliberate burials (Mellars 1987).

It is extremely difficult to evaluate accurately the Mesolithic period in the south west as we lack a comprehensive database in order to do this. This hinders any serious test of Rowley-Conwy and Zvelebil's 'availability' model for the transition to farming (Zvelebil and Rowley-Conwy 1984; 1986; Zvelebil 1995b). Many Mesolithic sites in Britain have been lost through submergence (Coles 1998), destroyed by modern ploughing or deeply buried due to alluviation and colluviation processes. It is difficult

Fig. 14 The position of Birdcombe, Somerset

Birdcombe
Somerset

Scale 1:1

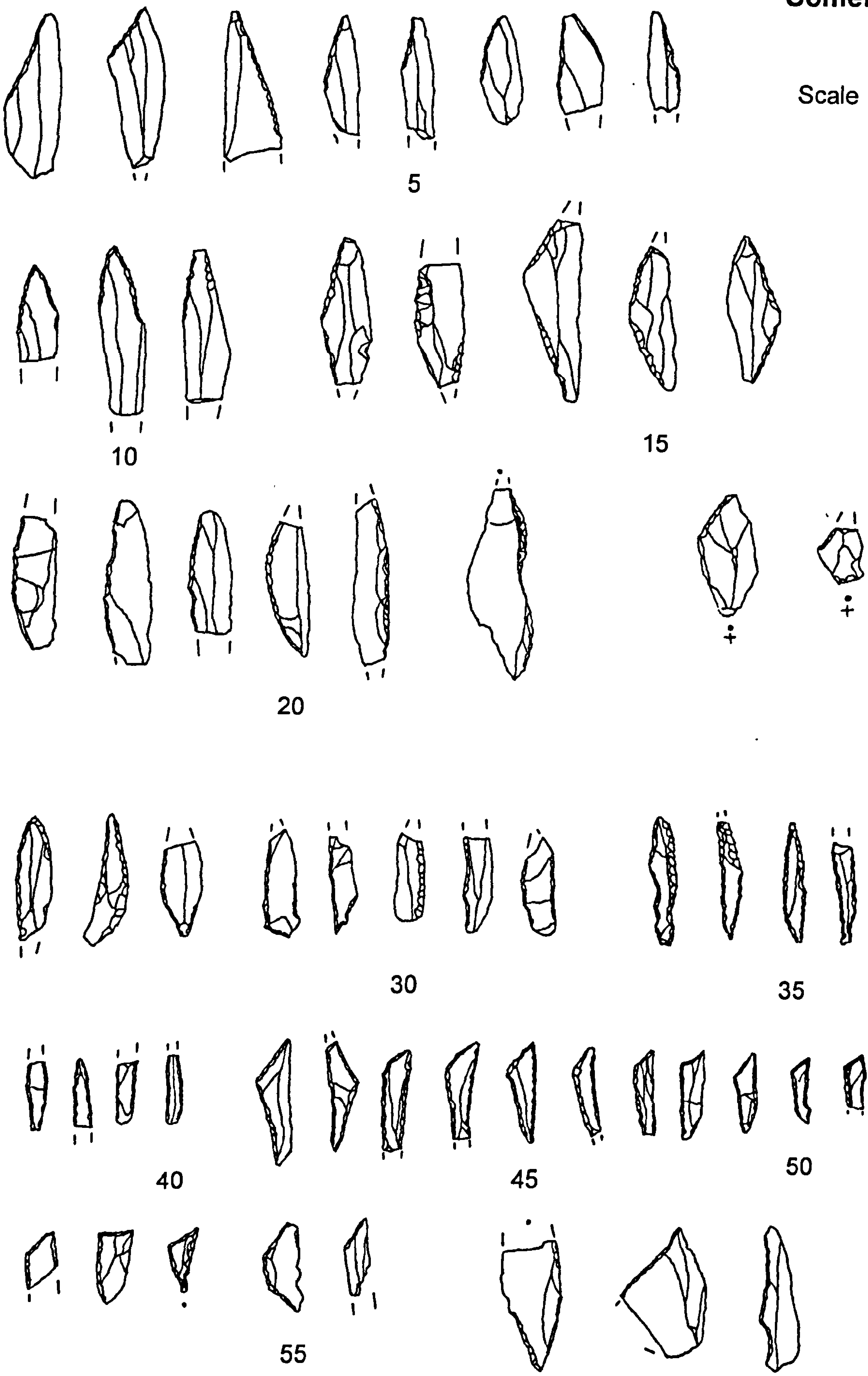


Fig. 15 Flint from the 1955 Excavation

(C. Norman 1999)

The 1955 Birdcombe Flint Collection Illustrated in Fig. 15

Ilustration Nos.	*Description*
1-8	Obliquely backed piece
9-11	Obliquely backed with opposed retouch at tip
12	Isosceles triangle
13	Bi-truncated piece (rhomboidal)
14,15	Bi-truncated piece (trapezoidal)
16	Isosceles triangle
17-21	Convex backed piece
22	Unclassified backed piece
23, 24	Short obliquely truncated flakes
25-29	Lanceolate
30-32	Broken (?) straight backed piece
33-40	Narrow lanceolate/rod forms retouched along both edges
41-54	Scalene triangles
55	Short trapezoidal piece
56	Small obliquely backed piece
57, 58	Small retouched piece – not microlith
59	Micro intermediate (?)

(C. Norman 2000)

to predict where these sites might be and although extensive fieldwork has been carried out in the Vale of Pickering, Yorkshire, it has failed to find a site of the calibre of Star Carr (Mellars and Dark 1998). It appears, therefore, that when the opportunity arises to investigate a Mesolithic site, it should be taken, as this is the only way we can expand our knowledge of the period

Birdcombe, Wraxall, North Somerset

Site location and previous research

The site at Birdcombe (ST475718) was discovered in the 1950's by C.M. Sykes and S.L. Whittle when they recovered through excavation hundreds of worked flints from the Mesolithic period, together with wood tar (Fig.15). The only surviving plans and literature relating to this excavation are contained in a publication of the Proceedings of the Somerset Archaeology and Natural History Society of 1960 which describes their excavation in 1955 (Sykes and Whittle 1960). The report contains little information as to the exact location of the flint recovered and lacks any survey indicating the position of the trench in the field. In 1952 Sykes and Whittle found a large quantity of worked flint in the ploughsoil. They also inspected one of the springs adjacent to the site and found hundreds of flint chippings, together with 28 worked flints including 21 microliths. In 1955 they dug 10 trial trenches from which approximately 620 worked flints were recovered. They subsequently dug an area 10 ft x 45 ft (3m x 13.8m) from which they recovered approximately 450 waste fragments, together with 34 worked flints including microliths from a context interpreted as a 'chipping floor' (Plate D). From all parts of the site, including the main excavation trench, they recovered 123 microliths including microburins.

Sykes and Whittle's excavation was initiated primarily to discover pit dwellings similar to those found in Surrey and Sussex (Rankine 1956). They also recovered from the 'chipping floor' an organic substance which they interpreted as 'wood tar' and which they believed was similar to that found by Clark at Star Carr (Clark 1954).

Aims and objectives of the 1997 Project

Few Mesolithic sites in North Somerset had been excavated. The quantity and quality of the flint recovered from the 1955 excavation suggested that the Birdcombe site had the potential to enable me to:

1. understand more fully the use of a lowland landscape by hunter-gatherer communities in the Mesolithic period;

2. obtain lithic evidence from an occupation site of the Mesolithic period using more sophisticated excavation techniques than had been previously used;
3. examine and re-assess the interpretation of the 'chipping floor' from the 1955 excavation;
4. question the validity of the 'wood tar' from the 1955 excavation;
5. provide an environmental sequence for the western end of the valley between the Failand Ridge and Nailsea island.

Methodology

Prior to excavation several methods of sampling, both in the excavation field called the Wood Ground (Fig.16) and the fields in the immediate vicinity of the excavation site were carried out in an attempt to locate concentrations of worked flint. Fieldwalking took place at the eastern end of the valley around the Belmont Hill area (ST514700), in five adjoining fields to ascertain whether there was any prehistoric use of the eastern end of the Failand Ridge valley. There were no specific concentrations of flint in these fields, although a large quantity of flint was recovered generally from the area, which suggests that the Belmont Hill area had been used extensively by prehistoric hunter-gatherers.

A geophysical survey in the Wood Ground failed to locate the 1955 trench, either through excessive dryness in the soil, or the area surveyed did not locate the original trench as no anomalies in the readings were apparent. The position of the nine trial trenches was, therefore, laid out using 1955 photographs as guidelines. Twenty six pits were sampled by shovel-pit testing over the excavation area and although none of the pits produced a sufficient quantity of flint to suggest a specific occupation area, the general scatter throughout the area sampled suggested that the field had been used by prehistoric hunter-gatherers in the past.

Fieldwalking was carried out in fields attached to Birdcombe Farm as well the excavation field itself, together with fields in the Belmont Hill/Failand Ridge valley area (ST514700). The results of fieldwalking suggested that although there were no specific areas of concentrated flint, the landscape surrounding Birdcombe Farm, as at Belmont Hill, had been used extensively by hunter-gatherers from Mesolithic period onwards.

Fig.16 Location map showing field names at Birdcombe, Somerset

Prior to excavation an earthwork survey was carried out in the Second River Ground to assess the environmental potential. This is the lowest lying field of the valley and the peaty deposits seen in the rhynne banks and the molehills suggested that there were buried peat horizons below the ploughsoil. The survey recorded the drainage channels in this field. The western edge of the Wood Ground which borders Tower House Woods and the north end of the Second River Ground, was auger cored. Five auger cores were extracted by hand to obtain a profile of the hillslope as well as a soil profile. This was carried out in order to assess the potential for any hillwash that might have sealed the Mesolithic horizon through colluviation processes in the post-Mesolithic periods. One auger core, (Fig. 17, Core No.6), as part of the above profile was taken in the Second River Ground to a depth of 2.85m. It contained deposits of peat, waterlogged wood and twigs. In 1998, as a result of analyses from Core No. 6, a 4m deep trench was dug in the Second River Ground using a JCB digger to obtain bulk environmental samples, together with a soil column for pollen analysis. Below the depth of 4m an auger was used to core to the river gravels at the base of the alluvial deposits. The column contained several peat deposits between layers of clays and muds, together with good molluscan and macrofossil evidence. It is hoped to obtain radiocarbon dates for the top and bottom of the column in the hope that the peat deposits were laid down in the Mesolithic period, but the palaeoenvironmental analyses will only continue when funds are available. Details and diagrams of the above fieldwork is found in the Appendix.

The 1997 Excavation

The 1997 excavation was directed by the writer and formed part of the undergraduate training excavation for the Department of Archaeology, University of Bristol. The Birdcombe site was dug by third year undergraduates over a three week period and then continued by the writer and volunteers intermittently over the next four months (Gardiner 2000).

Excavation Methodology

A grid laid out in 10m squares was placed across the western end of the Wood Ground covering an area 110m x 80m, which incorporated the earlier auger core positions and the fieldwork discussed above. The grid references are shown in Fig.18 and referred to in the text. All the spoil from the trenches was sieved, but towards the end of the excavation when work was concentrated in the main trench D, students were proficient enough to be able to detect the flint through trowelling alone. Bulk environmental samples were taken from each trench and wet sieved using a

Fig.17 Trench plan and location of auger cores at Birdcombe, Somerset

flotation tank on site. Only one worked flint was recovered from wet sieving. Soil samples were taken from Trenches C, G, F, H and D Main and D Long Extension for analysis by Andrew Jackson, Biological Sciences, University of Bristol. Environmental samples for pollen analysis were taken by Vanessa Straker, English Heritage, from D Long Extension at the end of the excavation. Time did not permit reaching natural geology in all trenches by the end of the excavation, but sections in all trenches were recorded. All contexts were divided into 10 cm. spits through the vertical section and the main trench D and its long extension was divided horizontally into half metre squares.

Site Geology (Plate G)

Birdcombe lies at the foot of a south facing slope which forms part of the Failand Ridge and adjacent valley, five miles south of Bristol in the parish of Wraxall, North Somerset (ST475718). The site is bordered by the wooded limestone hills of Tower House Woods in the north and a thin band of alluvium that forms the valley bottom between the coal and shale seams of Nailsea island to the south. The site itself lies upon Mercia Mudstone at approximately 10m O.D. and is well watered by many local springs in the vicinity (Green 1992). There are two immediately adjacent to the site, the larger of which is named the Whirly Pool. The smaller is the spring where Sykes and Whittle retrieved hundreds of flint chippings through sieving. The River Land Yeo, which flows from the east along the valley of the Failand Ridge and reaches the coast at Clevedon five miles to the west, was embanked and diverted in the Post Medieval period. The River Land Yeo, therefore, does not follow its original course, which was probably at the lowest lying point of the Second River Ground in the Mesolithic period.

Trial Trenches

Nine trial trenches (A - I) measuring 1m x 1m were laid out in order to, a) locate the original excavation trench and, b) as a sampling procedure for flint concentrations in the Wood Ground.. Two trial trenches were 2m x 1m, Trench J and Trench Z (Fourteen Acres Field). Due to the homogenous nature of the soil it was difficult to detect any cuts from Sykes and Whittle's earlier excavation trench and those trenches which produced very little flint (Trial Trenches A and B) were closed before reaching natural geology, whilst those that had greater concentrations were expanded or continued to natural geology. Trial Trench D had the greatest flint concentration and was expanded to 4m x 3m and continued as the main excavation trench.

Summary of Trial Trenches

Flint waste was found throughout the ploughsoil in most of the trial trenches in the Wood Ground (Fig.16) with a general scatter from the later deposits, except for Trench Z in the Fourteen Acres field which was sterile apart from a piece of burnt quartzite. The largest quantity of waste came from Trench H (43.01gm). The total weight from all the trial trenches (excluding Trench D) is 187.01gm and suggests that the area covered by them had had flint use in some form or other in the prehistoric period. Retouched microliths were found singly in Trenches E, F, and H. There was a scatter of charcoal found in most of the contexts with a concentration in Trench H. Most of the trial trenches gave a background suggestion of flint use throughout the site, Trenches C and G provided good local geological sequences for the deposits that had been laid down, both in the periglacial period and in the post-Mesolithic period. This enabled a reconstruction of the landscape and it can be shown, from the recorded sections, that colluvium had filled in and levelled a much steeper hillside slope from the Mesolithic period onwards. The homogeneity of the soil made it impossible to see any cuts or backfilling from the earlier excavation and the writer believes that the 1955 cut was not revealed in any of the trial trenches or the main excavation Trench D and its extended areas.

Main excavation Trench D

Trial trench D (Plate E) was the most prolific in terms of quantity and quality of flint and was extended to 4m x 3m and a further 40m x 1m to the north and 14m x 1m in the south (Fig.18).

The south extension produced only a small quantity of flint and the excavation continued in the 4m x 3m trench (D Main) and its 40m extension to the north (D Long Ext) to be discussed later in this chapter. Trench D was dug horizontally in half metre squares and vertically in 10cm spits and any earlier cut of the 1955 trench was not apparent. It was sectioned in the north west corner (W79/N37) when natural clay was reached at a depth of 107cm and interpreted as the purple clay referred to by Sykes and Whittle (1960). It was not possible to recover all the flint from Trench D by the time of back-filling at the end of the excavation, although the majority of metre squares had been taken down to a depth of 85cm at Context 3-VI which was below the main flint horizon.

There was a scatter of charcoal throughout the trench with a concentrated spread in W79/N37 of Context 3-II. There was no evidence of the 'chipping floor' as described

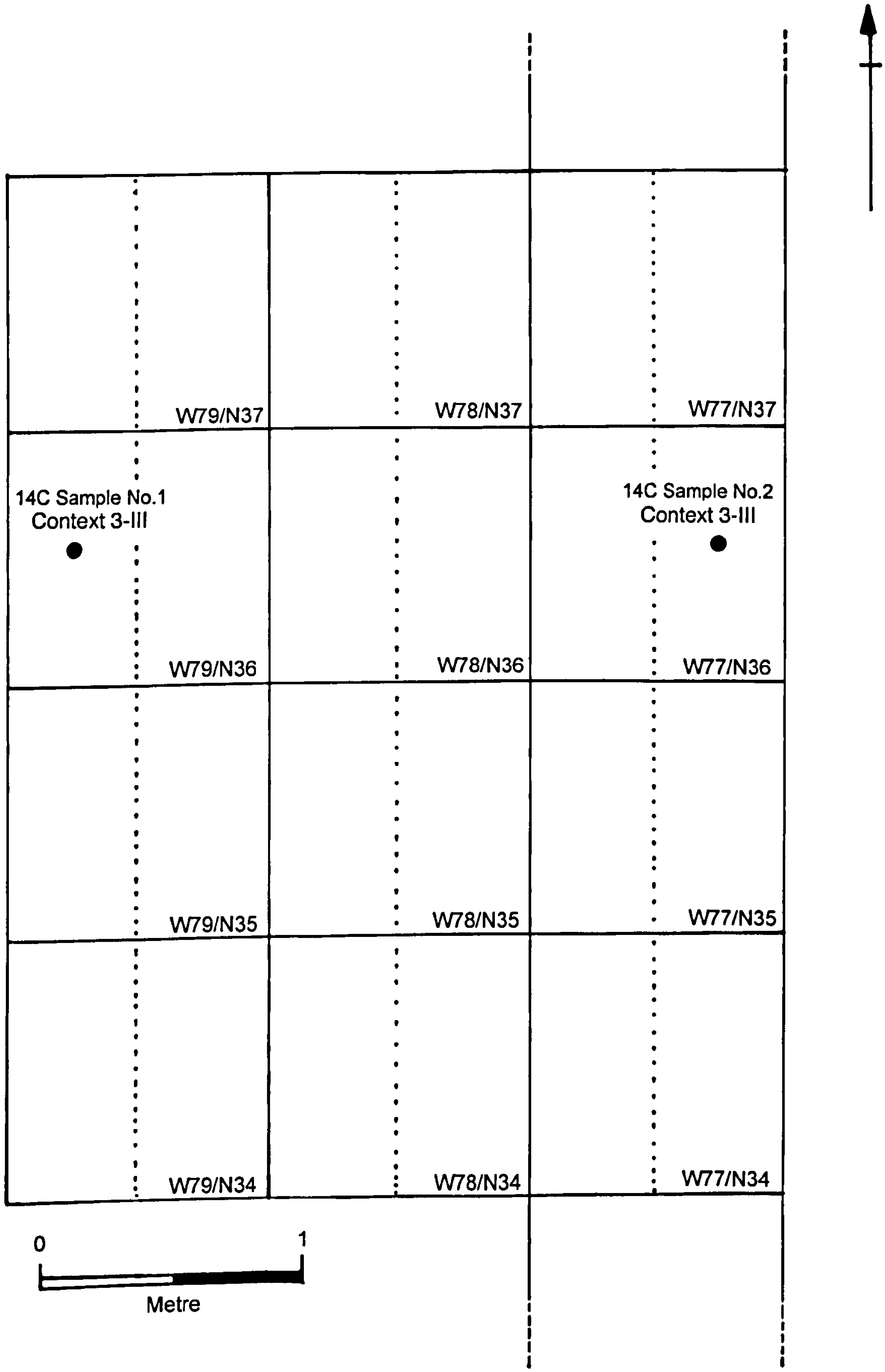


Fig. 18 **Main Trench D, Birdcombe, Somerset.**

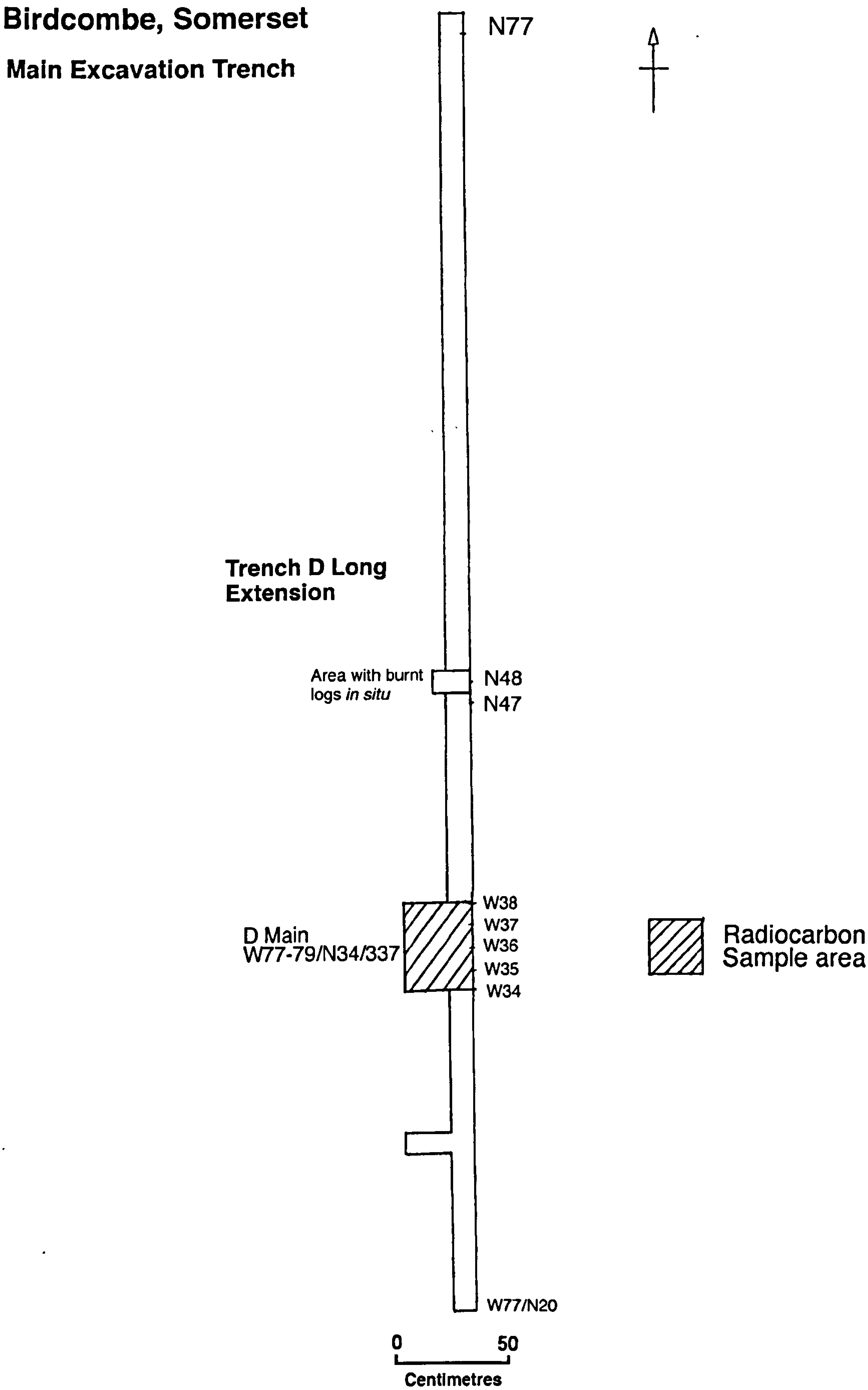


Fig. 19 Main Excavation Trench showing radiocarbon sample area

Birdcombe, Somerset

East facing section
Trench D Main W77-79/N34-37

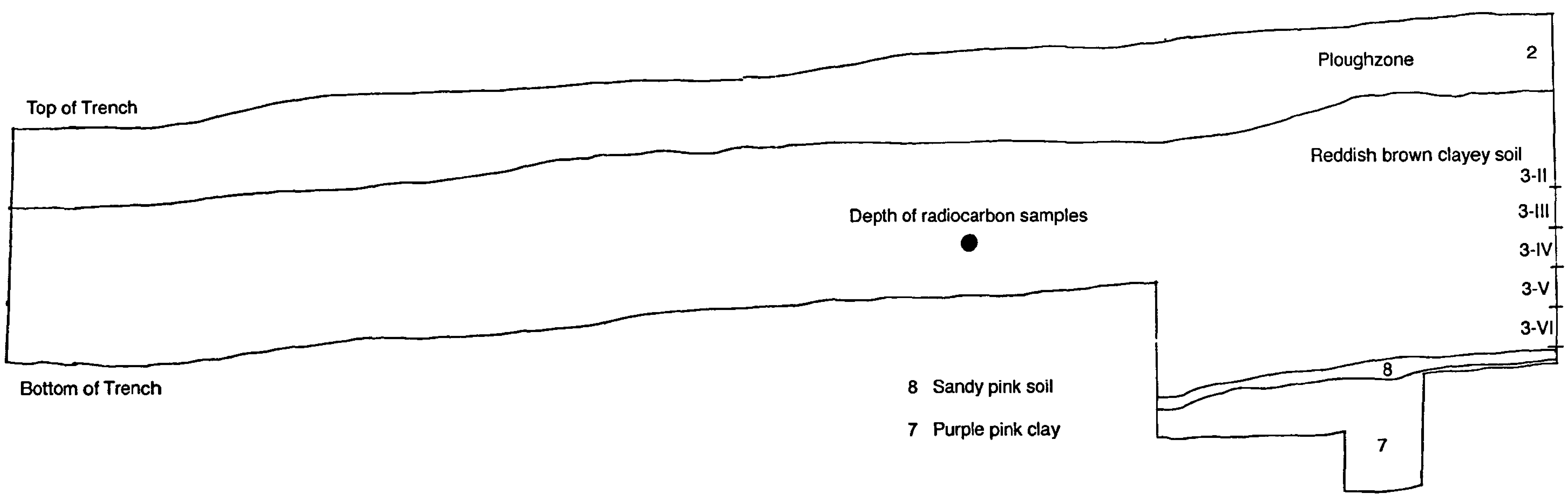


Fig. 20 Section of Trench D showing the position of the radiocarbon samples

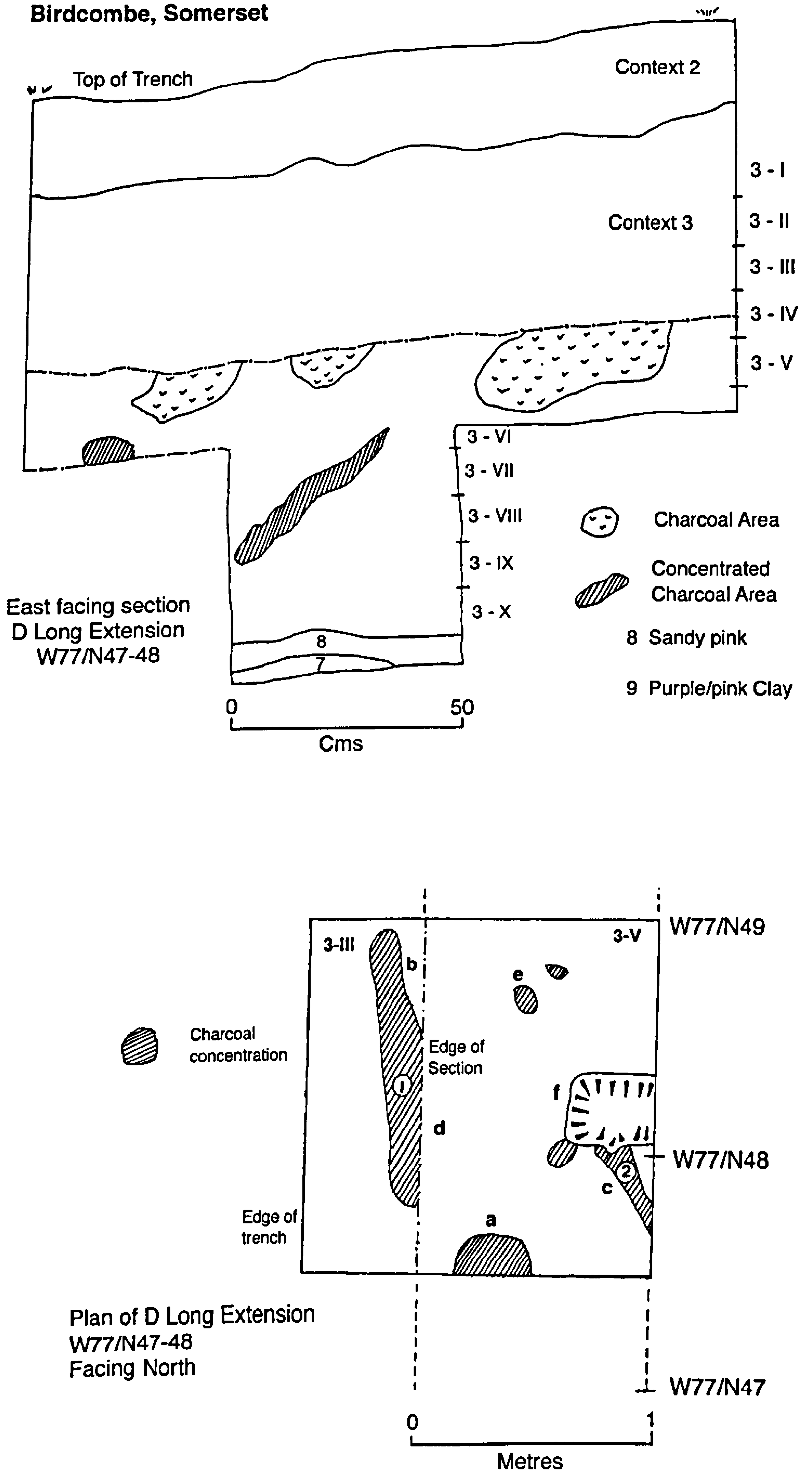


Fig. 21 Areas of concentrated burning (D Long Extension)

by Sykes and Whittle (1960, 108), although before the original trial trench D (W77/N36) had been extended there appeared to be a gully and a hard surface at a depth of 65cm. However, once the rest of the trench had been taken down to this level, there was no further evidence of a different surface. The darker pink area in W78/N34 containing burnt flint when sectioned was not a hearth as initially believed. Contexts I – VI consisted of homogenous red, clayey soil interspersed with natural areas of darker soil, some containing patches of charcoal or small lumps of sandstone.

Trench D Long Extension

Although D Long Ext. was extended 43m north of the main trench, little flint was recovered from the far north end. There was a concentration of charcoal 10m north of the main trench at W77/N47-48 with a little flint waste, a core and 3 microliths: a retouched blade; an elongated scalene and a convex backed microlith. This part of the trench appeared to have burnt logs *in situ* and few flint associations (Fig.21) except for the elongated scalene (Fig.22, 20). Pollen samples were taken from this area and the charcoal was identified as predominantly oak (*Quercus sp.*), with some hazel (*Corylus avellana).* This area was taken down to the natural purple clay at 120cm. South of this area the recovery of flint was similar in quantity to that in the main trench.

The flint collection

There was a distinct flint horizon between Contexts 3-II and 3-IV which was a 30cm thick deposit, the bottom of which reached a depth of 66cm. The contexts above this horizon contained a considerably smaller concentration of flint and very few flints were recovered below it.

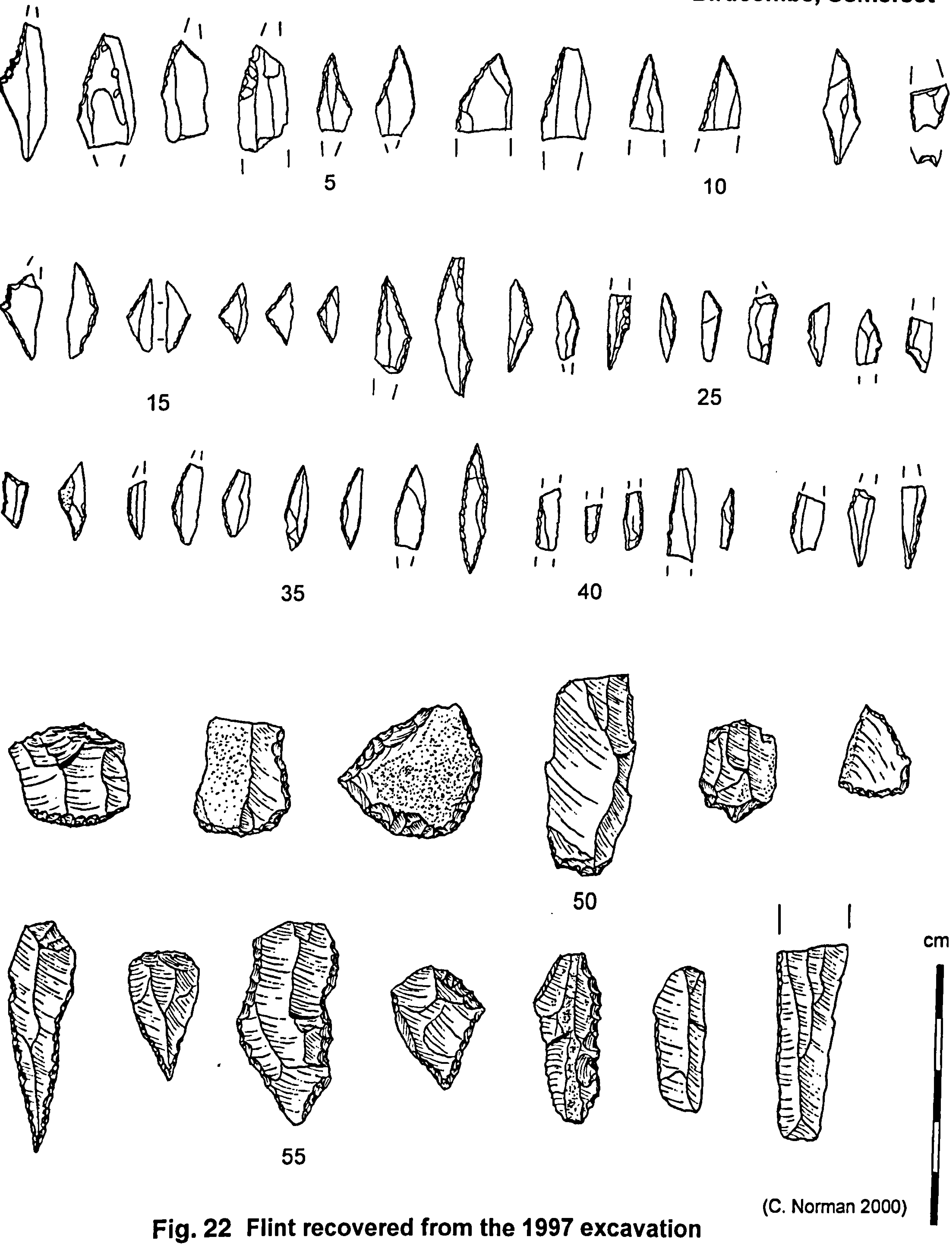
The total weight of waste flint from Trench D is 1628.45g and the total weight of retouched tools is 84.15g. From approximately 1600 waste fragments, there were 97 retouched tools, together with 23 cores (total weight 469.54g). Included in the collection is an artefact of Pennant Sandstone with a small counter-sunk depression at one end (89.89g) (not illustrated) and five pieces of worked quartzite. A quantity of limonite was also recovered from Trench D, total weight 112.3g, together with 7 sherds of Medieval pottery. See Appendix for list of finds.

The flint industry as a whole consisted of raw nodules, cores and waste. The retouched tools included a non-geometric element from the earlier Mesolithic period

(Fig. 22, 1-12); geometric microliths from the later Mesolithic period (Fig.22,1-46), microburins (Fig.23, 60, 61) and a quartzite hammerstone (Fig.23, 64). The majority of the flint was patinated and a small amount of Carboniferous chert was present. There were 11 scrapers (Fig. 22, 47-52). Within the collection of cores were three micro-cores which are diagnostic of the later Mesolithic period (Fig.23, 63). 6 diagnostic tools were recovered from the Trial Trenches, together with a non-patinated French gun-flint, found in Context 2-I above the main flint horizon. There were 20 unclassified tools. Of the diagnostic tools, 48 were from the later Mesolithic period and 15 were from the early Mesolithic, which suggests that Birdcombe was a site that was used predominantly in the later Mesolithic period. Although there is a small amount of mixing of early and later diagnostic pieces throughout the trench, probably as a result of worm action, the general pattern of the flint recovered from the main Trench D is that the later Mesolithic period is represented by a homogeneity of diagnostic tools in the upper sequence found between Contexts 3-II and 3-III, with the early Mesolithic represented by tools in the lower sequence found in Context 3-IV. This is particularly so of square W77/N37 where there is a complete sequence of later tools within Contexts 3-II to 3-III, with obliquely blunted points (early Mesolithic) (Fig.22, 1-11) being recovered lower in the sequence from Context 3-IV. In square W77/N36 there is a sequence of later tools between Contexts 3-II and 3-III, which contains no early tools and in square W78/N35 the later tools are found between 3-II and 3-II, with the early tools found in 3-III and below with no mixing.

There are anomalies within the collection with 3 microliths and an un-retouched piece, made of Carboniferous limestone, which consist of a lanceolate point (Fig.22, 37); an obliquely blunted point (Fig.22, 8); an unworked fragment from Trial Trench H. This suggests that the source for this raw material may be some distance from the site as it is not found within the local geology.

Probably the most interesting find is a fragment of a Horsham, hollow-based point (Fig.22, 12) which was recovered north of the main trench D from Context 3-I (D Long Ext. W77/N38-42) and is associated with two cores from the same context. The British Mesolithic was originally divided into two chronological phases, "early" and "later" by Francis Buckley in 1924, with a boundary around the 8th millennium BP. The "early Mesolithic" incorporates assemblages that had originally been called Maglemosian" and termed "Broad Blade", with the "later Mesolithic" or Sauveterrian as coined by Clark in 1955, as "Narrow Blade" (Pitts and Jacobi, 1979, 164). The Horsham industry falls into the early Mesolithic division (Jacobi 1978). The term

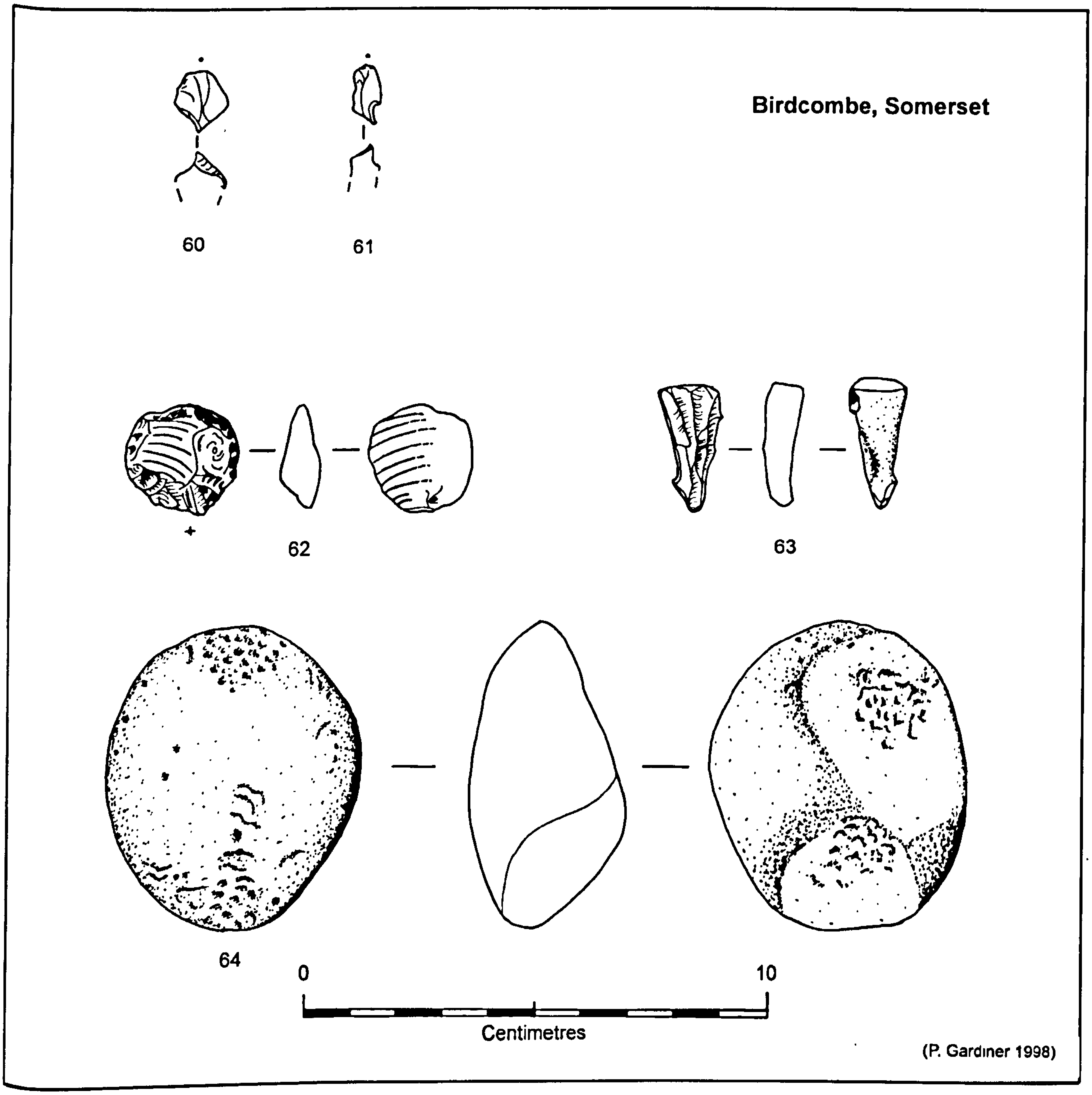


(C. Norman 2000)

Fig. 22 Flint recovered from the 1997 excavation

The 1997 Birdcombe Flint Collection Illustrated in Fig. 22

Illustr. No.	Description	Early/Late	Trench	Context
1	Obliquely blunted point	Early	D	W79/N35 W, 3-II
2	Obliquely blunted point	Early	D	W78/N35 W, 3-III
3	Obliquely blunted point	Early	D South	W77/N20-29, 3-II
4	Obliquely blunted point	Early	D	W77/N37 E, 3-IV
5	Obliquely blunted point	Early	D	W78/N35 W, 3-II
6	Obliquely blunted point	Early	D Long ext	W77/N38, 3-II
7	Obliquely backed angled retouch	Unclass	D	W79/N35 E, 3-II
8	Obliquely blunted point (Carb.Limest)	Early	D Long ext	W77/N48-52, 3-I
9	Obliquely blunted point	Early	D 2nd ext	W77-79/N34-36, 3-II
10	Obliquely blunted point	Early	D	W78/N36 W, 3-II
11	Obliquely bi-truncated rhombic	Early	D	W77/N37W, 3-IV
12	Horsham hollow-based point	Early	D Long ext	W77/N38-42, 3-II
13	Scalene triangle	Late	D	W79/N36 W, 3-III
14	Triangle	Late	D	W78/N35 E, 3-III
15	Scalene triangle	Late	D	W77/N36 E, 3-III
16	Scalene triangle	Late	D	W77/N36 E, 3-III
17	Small isosceles	Late	D	W78/N36 E, 3-III
18	Scalene triangle	Late	D	W77/N35, 4-I
19	Triangle	Unclass	D	W78/N35 W, 3-III
20	Scalene triangle	Late	D Long ext	W77/N48-52, 3-II 5b
21	Scalene triangle	Late	D	W78/N37 E, 3-III
22	Isosceles triangle (Greensand Chert)	Late	D	W77/N36 W, 3-II
23	Triangle	Late	D	W79/N36, 3-II
24	Scalene triangle	Late	D	W79/N37 W, 3-III
25	Isosceles triangle	Late	D	W77/N35, 4-I
26	Lanceolate	Late	D	W77/N37 W, 3-II
27	Scalene triangle	Late	D	W77/N37, 3-II
28	Scalene triangle	Late	D Long ext	W77/N43-47, 3-I
29	Scalene triangle	Late	D	W77/N35 E, 3-II
30	Scalene triangle	Late	D	W79/N35 E, 3-III
31	Scalene triangle	Late	D	W77/N36 W, 3-III
32	Convex backed microlith	Late	D	W79/N36 W, 3-III
33	Convex backed microlith	Late	D	W77/N36, 3-II
34	Convex backed microlith	Late	D	W77/N35W, 3-IV
35	Triangle	Late	D	W77/N37 E, 3-II
36	Triangle	Late	D	W77/N36, 3-II
37	Lanceolate (Carbon. Limest)	Late	D 1st ext	W77/N36, 3-I
38	Lanceolate (recent break)	Late	F	W68/N16, 3-1
39	Straight backed bladelet (rod)	Late	D	W77/N37 E, 3-III
40	Micro rod (fragment)	Late	D	W78/N37 E, 3-IV
41	Micro rod	Late	D	W77/N37 E, 3-II
42	Straight backed bladelet (rod)	Late	D	W78/N34 W, 3-II
43	Narrow straight backed bladelet (rod)	Late	D	W79/N34 W, 3-II
44	Microlith fragment	Late	D	W77/N37 E, 3-II
45	Triangle	Late	D	W79/N35 E, 3-III
46	Triangle	Late	D	W77/N37 E, 3-II
47	End scraper on flake	Early	D Long ext	W77/N43-47
48	Scraper	Unclass	D	W77/N35, 4-1
49	Scraper	Unclass	D	W77/N36 W, 3-III
50	Blade end scraper	Early	D long ext	W77/N38-42, 3-II
51	Scraper	Unclass	D South	W77/N20-29
52	Scraper, end and side	Unclass	D	W78/N37, 3-III
53	Meche de foret	Early	D	W79/N36 W, 3-11
54	Awl	Unclass	E	W79/N7, 3-I
55	Elongated flake	Late	D	W77/N37 W, 3-II
56	Steeply retouched edges	Unclass	D 2nd ext	W77-79/N34-37, 3-I
57	Blade, retouched with abraded end	Unclass	D	W77/N36 W, 3-IV
58	Retouched blade on one margin	Unclass	D Long ext	W77/N74, 3-I
59	Blade, lightly retouched edge	Unclass	D Long ext	W77/N47, 3-II



Nos. 60, 61 Microburin; No. 62 Thumbnail scraper; No. 63 Microcore;
No. 64 Quartzite hammerstone

Fig. 23 Flint from the 1997 Excavation

"Horsham point" has been defined by Jacobi (1978) as belonging to the asymmetric form of the hollow based points found in the Weald of south east England. Reynier (1998, 182) subsequently suggests that flint belonging to Horsham assemblages usually comes from low lying valley slopes, or plateaux after 9000 BP. He also suggests that any hollow based points found outside the Wealden and the south east of England are more likely to reflect a secondary influence through exchange, rather than being associated with a specific Horsham industry (Reynier 1998, 178). Several of them have been found in south west England, which include: two hollow based points in association with isosceles triangles and a broad blade obliquely blunted point at Yelland, Devon (Rogers 1946); one Horsham point at Aller Farm, Somerset (Berridge 1985); at Shapwick Burtle which was originally identified as a broken obliquely blunted point, but re-identified by Roger Jacobi as a hollow based point (Jacobi 1979, 73); an elongated hollow-based point from Edington Burtle (ST393427) (C. Norman pers. comm.). Topographically, none of these finds were recovered from river valley slopes. It should be noted that Wainwright (1959) also identified a Horsham point from Freshwater West in Pembrokeshire and a further Horsham point from Cheddar Head forms part of the Cooper Collection in Wells Museum, Somerset.

Norman's forthcoming publication refers to an early Mesolithic site at Parchey, near Chedzoy, Somerset and suggests that some hollow based points are found in association with isosceles triangles and that the Horsham industry may not be an industry specifically related to south east England (Norman 2001 forthcoming). He believes that at Birdcombe, there are essential elements within the collection of a possible Horsham industry (Norman, pers. comm.) and both the 1955 and 1997 excavations have no obvious broad blade industry. The 1997 excavation recovered three isosceles triangles from the main trench which include (Fig.22, 22,25) although not in direct association with the Horsham point from D Long Ext. The Horsham point from Birdcombe is the furthest north west this type of flint has been found and the site is on a valley slope, which fits into Reynier's Horsham category (1998, 178). If, as Norman suggests, the other finds in the west country are not a "secondary influence" as suggested by Reynier (1998), the hunter-gatherers at Birdcombe and other south west sites may have had more than a loose connection with hunters from the south east of England. Horsham points have been dated from between 9000 BP to 8000 BP and the Birdcombe hunters could have been using the site at any time between those dates. This is also attested by the presence of eleven obliquely blunted points (Fig.22, 2-11) and an awl or Mêche de foret (Fig.22,53) which are diagnostic tools from the early Mesolithic period.

The four unpatinated scrapers (not illustrated) may be of late Neolithic/Early Bronze Age. Two were recovered from Trench D Context 3-I, and a third from Context 3-II, with the fourth from D Long Ext. Context 3-I. The French gun-flint recovered from Context 2 in Trench I is post-Medieval. There are no flints on the site from the early Neolithic period. These scrapers do not appear to belong to the rest of the collection which is highly patinated and found in lower deposits, although as a tool type, they would not be out of place within a Mesolithic collection.

Flint is not naturally found in Somerset and the large quantity of debitage which contains flakes and cores with cortex, together with 8 microburins and 23 cores, suggests that the raw material was brought to the site in small nodules for knapping. The small size of the cores and waste suggests that the flint was used economically. Sykes and Whittle believed that the majority of the flint they recovered in 1955 was poor quality gravel flint from the lower hill slopes at Birdcombe or from the River Land Yeo. The chert found at Birdcombe is out of a river gravel, but the River Land Yeo does not feed back into the Greensand Ridge of the Blackdown Hills, Somerset which might be a source for this raw material (C. Norman pers. comm.). The nearest local source is from the gravel terrace deposits at Chapel Pill, Ham Green (ST543758) approximately 7km north east of Birdcombe (Davies and Fry 1929; Hack and Cornish 1991), although there is no evidence that the Birdcombe hunters were obtaining their raw material from this location. The tools that have been recovered from this site are chopper tools from the Lower Palaeolithic period (Hack and Cornish 1991) and may not have been suitable for the manufacture of microliths. Much of the Birdcombe flint is of high quality and brought in from a considerable distance. The nearest flint source is 40km away on the Marlborough Downs, Wiltshire. There is no weathering on the flint nodules which might suggest that they had been lying on the ground surface, but the cortex is fresh which indicates that the flint had been taken directly from the chalk. There no evidence of beach pebbles having been used for knapping on the site.

Non-flint finds

The quartzite hammerstone (Fig.23, 64) is similar to that found in the 1955 excavation and has evidence of working at both ends. Quartzite can be found within the local geology.

Four pieces of locally occurring limonite, weighing 111.95gm within the main flint horizon were recovered. Both haematite, which was found throughout all contexts on site, and limonite were used as a pigment in the Mesolithic period.

Organic material

Three fragments of charred hazelnut (*Corylus avellana*) were recovered from the main trench within the flint horizon. Two fragments were found in the same context (W78/N35 3-III) as two obliquely blunted points, which are diagnostically early Mesolithic and a triangle. A third hazelnut fragment was recovered from context W78/N36 3-III and associated with an obliquely blunted point from the same half metre square in the spit above it (3-II).

Sykes and Whittle (1960) believed that they had recovered two pieces of woodtar. Elizabeth Aveling (1998) analysed this substance by gas chromatography and gas chromatography/mass spectrometry which indicated that it had a coniferous origin. Aveling's interpretation suggests that Sykes and Whittle's woodtar may have been a natural product, rather than an anthropogenic artefact. She suggests that it was formed as a result of an accumulation of resin from a wounded tree which was accidentally pyrolysed during a forest fire. Aveling points out that there are very few prehistoric examples of coniferous tars in any of the Mesolithic samples she had analysed. (See Appendix). It seems unlikely, therefore, that the organic substance that Sykes and Whittle found was woodtar of the type found at Star Carr, where numerous rolls of birch-bark were recovered, as well as two barbed points and a microlith embedded in resin (Clark 1954, 116-7)

A small quantity of organic material was recovered in 1997 from Trench D Long Ext (W77/N47-48). It was analysed by Professor Richard Evershed, Department of Chemistry, University of Bristol, using pyrolosis, gas chromatography and gas chromatography/mass spectrometry. The analysis showed that the substance was probably a by-product formed as a result of burning wood (Richard Evershed pers. comm.)

The 1999 Fieldwork: Bulk environmental samples and column

The samples recovered from core No.6 in the lowest lying field (10.98 OD) Second River Ground (Fig.17) adjacent to the excavation site, suggested that peat might have been laid down in the Mesolithic period. A 4m deep trench was dug by a JCB digger to obtain bulk environmental samples, together with a column for pollen, plant macrofossil and molluscan analyses. Four monoliths (50cm x 10cm x 10cm) were extracted from the east wall of the trench. Within the column were two distinct peat horizons at depth of 1.75m (base) and 2.25m (base) respectively, separated by layers of clay. At the base of tin No.5, the clay contained organic material such as twigs and plants. The samples derive from sealed contexts and a limited amount of funding has been obtained for radiocarbon dating of the peat. Further funding will be sought for palaeoenvironmental analyses which, it is hoped, will provide a local environmental context for the site (see Appendix for section drawings).

Radiocarbon dating

Two radiocarbon AMS dates have been obtained from oak charcoal from Trench D (Figs.18, 19). Sample No.1 was taken from W79/N36 Context 3-II West and associated with a convex backed microlith, a scalene triangle, a broken triangle, a bladelet core from the later Mesolithic period and the Mêche de foret from the early Mesolithic.

Sample No. 2 was taken from W77/N36 Context 3-III East and associated with three scalene triangles. The radiocarbon dates were obtained to try and establish the latest phase of activity at Birdcombe (Tables 6 and 7).

The two dates were calibrated using the probability and dating method of Bronk Ramsey (1998); the probability method of Stuiver and Reimer (1993); the data of Stuiver *et al.* (1998). See Appendix for Beta Analytic documentation.

TABLE 3

SAMPLE NO.	*MATERIAL*	*LAB CODE*	*RADIOCARBON YEARS BP*	*CALIBRATED BC 2 SIGMA*
1	Oak charcoal	Beta-147105	4700 +/- 50	3637 - 3362
2	Oak charcoal	Beta-147106	5420 +/- 60	4358 - 4047

AMS dates from Trench D Main

Sample No.2 (4358 – 4047 cal.BC) suggests a late date for Mesolithic activity at Birdcombe and the site can be seen as the latest date for Mesolithic activity in south west England and in Britain overall (Table 6). It overlaps with the Neolithic dates for Broome Heath, Norfolk (4492 – 3979 cal.BC), the Whitwell long cairn (4433 – 3981 cal.BC) and the Hembury causewayed enclosure (4450 – 3700 cal.BC).

Sample No. 1 (3637 – 3362 cal.BC) falls into the Neolithic range suggested by the dates in Table 6, but the absence of any early Neolithic activity at Birdcombe suggests that the Mesolithic activity on the site continued into the Neolithic period and almost to the time of the construction of the Post Track (3838 calendar years BC). Hunter-gatherers, therefore, had a lingering presence at Birdcombe, even though they must have been aware of monument building elsewhere.

A wider interpretation

Birdcombe did not prove to be a site where detailed information about the regional transition to farming was available as there was no evidence of continuity into the early Neolithic period. The radiocarbon dates, together with the flint typology confirm Birdcombe was in use from the early to the later Mesolithic periods. Although flint was scattered generally across the excavated area, there appears to be a specific knapping zone within the main excavation trench. The flint is predominantly from the later Mesolithic period, which was recovered from well stratified deposits, with a little mixing in some of the contexts, but overall, the stratigraphy is well defined. There is evidence of a Horsham industry, with the fragment of the hollow based point and associated isosceles triangles and the location of the site fits into Reynier's definition of Horsham industries coming predominantly from valley slopes. This suggests that the people using Birdcombe had long distance connections. This is also attested by the high quality of the flint raw material found on the site. Microliths belonging typologically to both the early (Fig.22,1-12, 53) and the later Mesolithic periods (Fig.22,13-46) are present within the main flint horizon, which suggests that the site was used for flint knapping over a considerable period of time.

There are four key dating elements for the site. The presence of the small, early Maglemosian pieces recovered by Sykes and Whittle, together with the Mêche de foret suggest use of the site in the early Mesolithic period; the smaller obliquely blunted points, the isosceles triangles and the Horsham point suggest a later phase around 8000 BP; the smaller geometric microliths of the later Mesolithic period and the radiocarbon dates suggest a very late Mesolithic presence. The flint collection suggests repeated phases of activity, rather than continuous occupation.

There are no early Neolithic flint tools at Birdcombe. The radiocarbon dates, therefore, suggest prolonged use of the site by hunter-gatherers, even possibly into the Neolithic period. The phasing out of Mesolithic flint above the top of the main flint horizon, Context 3-II, suggests that the site went out of use fairly abruptly at the end of the Mesolithic period and was not used again in later periods. However, the build up of approximately 1 metre of soil as a result of colluviation which sealed the Mesolithic horizon, suggests that a certain amount of clearance had taken place in the area after the Mesolithic period, although there were no stratified deposits containing flint to suggest when this might have been. There is no archaeological evidence for the site's abandonment, but it is hoped that the palaeoenvironmental record may supplement the lithic evidence.

The Birdcombe valley runs west-east in a sheltered position between the south-facing slopes of the Failand Ridge and Nailsea island. The River Land Yeo was embanked in the Post-Medieval period and today flows above the estuarine alluvium in the valley bottom of the Second River Ground (Fig.16). There is a line of springs at the base of the limestone ridge at approximately 10m O.D. which follows the natural contour towards Gatcombe, three miles to the east (ST527699) with a cluster of springs next to the site itself. Palaeoenvironmental work at Birdcombe will continue when funds are available, but previous studies at Kenn Moor 2km to the south-west and the Gordano Valley, 1km to the north-west, suggest that between the Atlantic and Sub-Boreal periods the area was much wetter with fluctuations between saltmarsh and fresh-water conditions (Jefferies *et al.* 1968; Butler 1987; Gilbertson *et al.* 1990). If analogies can be drawn from these neighbouring valleys with the Birdcombe environment, the abundance of wetland resources in the area may have been one of the attractions to the site throughout the Mesolithic period. Fish, water-fowl and reeds would have probably been available from the valley floor, together with edible, aquatic plants. Game, wildfowl, nuts and berries were obtainable from the slopes of the Failand Ridge. The valley bends south-east in a wide arc towards Gatcombe and by following the river and the lower contours of the limestone ridge, similar resources would have been available within an hour's walk from Birdcombe. Fieldwalking in this area (ST513700) attests to the extensive use in the prehistoric period of this part of the valley.

Birdcombe is the only significant occupation site known in the North Somerset area for the Mesolithic period, although there are many isolated finds of Mesolithic material between the Avon Gorge and the Failand Ridge. To the west, Mesolithic artefacts have been found at Blackstone Rocks, Clevedon, now a coastal site (Sykes 1938) and also in the Clevedon and Portishead areas, but none contain the quantity of microliths that might suggest a knapping site or occupation. Even on the Mendip Hills where there is evidence for human burial at the caves of Aveline's Hole, (Davies 1920-21), Gough's Cave (Davies 1904) and Totty Pot (Barrington and Stanton 1970; C.J. Hawkes pers. comm.), there is no conclusive evidence for late Mesolithic settlement on open ground. Fieldwalking on Mendip has produced Mesolithic flint (Williams, 1984; Taylor and Smart, 1983) but excavation at Wright's Piece by the writer in 1998 indicates that the microliths found by Williams (1984) are likely to have been hunting losses rather than an occupation site as previously thought.

The radiocarbon dates suggest a protracted presence by hunter-gatherers at Birdcombe that continue into the Neolithic period. There are no other dated sites in Somerset for comparison, but within the south west peninsula Birdcombe is later than the secure Poldowrian date 6450 ± 110 BP (5618 – 5149 cal.BC) (HAR-4568), Westward Ho! 6585 ± 130 BP (5726 – 5303 cal.BC) (Q-672) and Culverwell 7101 ± 97 BP (6201 – 5774 cal.BC) (BM-960). Within Britain it overlaps with the Neolithic dates from Broome Heath, Whitwell and Hembury (Chapter 7,Table 6).

Totty Pot, Cheddar, Somerset

Site location and previous history

Totty Pot is situated in the parish of Cheddar, Somerset, (ST482535). It is a swallet hole (Plate B), the entrance to which lies on the level plateau of a rock outcrop at a height of 245m O.D. and is approximately 1.25km south east of Cheddar Gorge. Today, the site is bordered by fields laid to pasture in the north-west and south, with a steep hillside that drops down to Cliff Road in the north. Even though the height above sea-level gives the site good all-round visibility, the open aspect makes its position very exposed to the climate. In the Mesolithic period, aurochs (*Bos primigenius*) were found on Mendip, and auroch horn and bone have been recovered from the swallet hole. Aurochs bone has also been found in the Charterhouse Warren Farm swallet, four kilometres north east of Totty Pot. Aurochs were found on Mendip up until the Bronze Age (Burleigh and Clutton-Brock

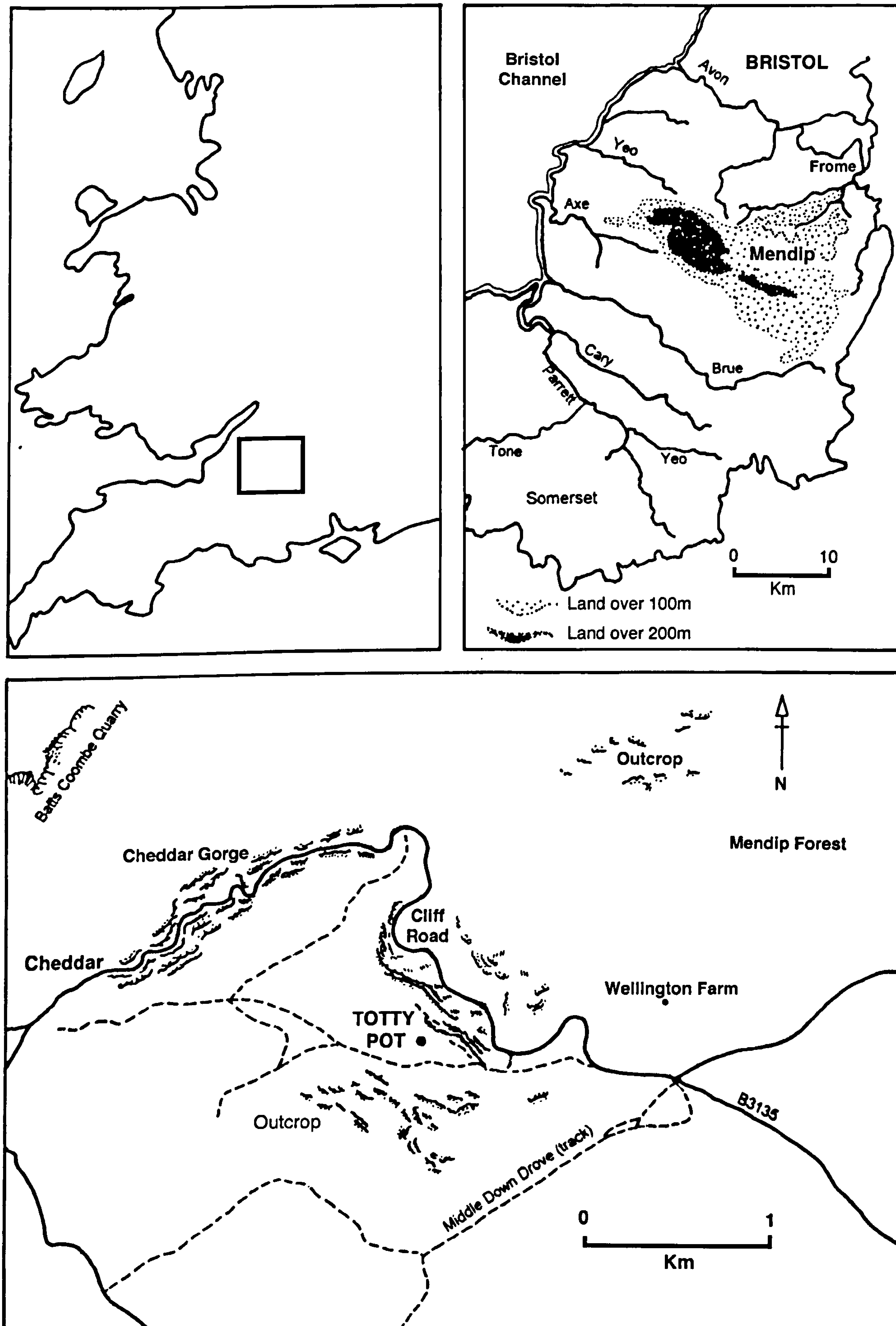


Fig. 24 The Position of Totty Pot, Somerset

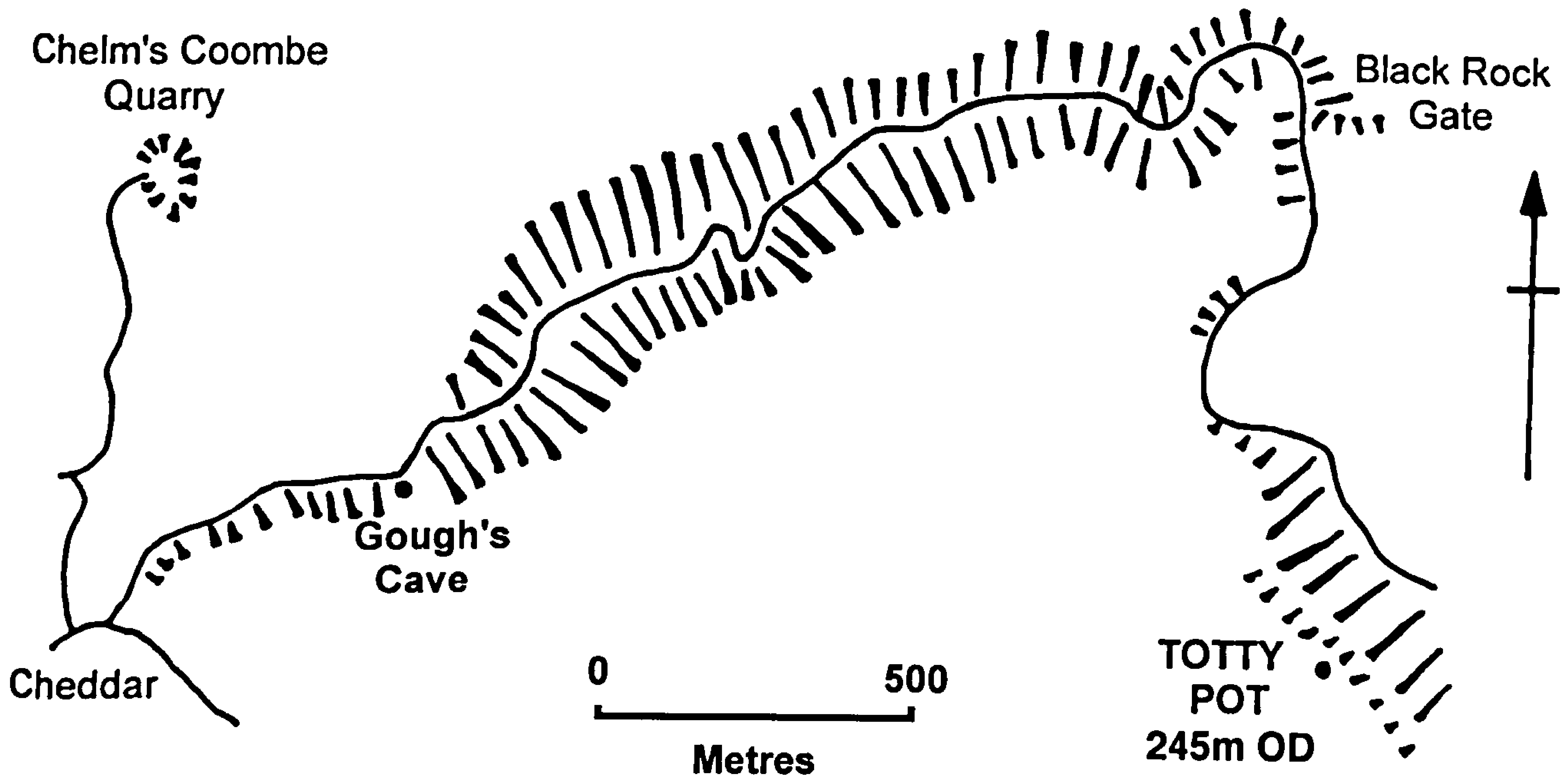


Fig. 25 Location of Totty Pot and Gough's Cave
(after Barrington and Stanton 1977)

1977). They were animals which liked open ground with some vegetation and their presence in the area, suggests a similar type of environment in the Mesolithic period.

In the early 1960's the swallet was discovered by Christopher Hawkes and subsequently excavated by the Wessex Caving Club with the objective of discovering a cave chamber. A 4m deep shaft was discovered and cleared, together with small chambers east of the shaft. The archaeological finds were detected during the chamber's excavation and were also recovered from the spoil heap. The present access to the swallet is by the shaft, which is approximately 4m deep and 75cm wide, which leads into a short tunnel giving access into a small chamber approximately 1m high, but opening up to 2m at the highest end (Plate F). The deposits which compose the present floor and roof of the chambers remain for future excavation.

Both human and animal bone were recovered from the swallet hole. The animal bone included aurochs (*Bos primigenus),* wolf, red deer, badger, vole, mole, sheep and pig. A proportion of the large animal bones, such as aurochs, were deposited with Cambridge University. From the human bone, which was fragmented, there was an estimated minimum number of three adults and one child found in the far chamber (C.B. Denston, University of Cambridge, unpublished report. See Appendix). These skeletons were destroyed by the Leicestershire Constabulary, but there is an unpublished radio-carbon date from a remaining femur of 8230 ± 60BP (7541 – 7086 cal.BC) which places it at the beginning of the later Mesolithic period (pers.comm. C.J. Hawkes).

20 pieces of worked flint from the Mesolithic period, together with 2 microburins were recovered, both on the spoil heap and inside the chamber during the earlier excavation (Fig.26). The flint consists of microliths, including 7 convex backed pieces (Fig.26, 1-6, 8); 2 lanceolates (Fig.26, 7,12), 3 straight backed bladelets (rods) (Fig.26, 9-11), 7 scalenes (Fig.26, 13-19) and the tip of a larger broken microlith (20). Also included are 9 unretouched blades, 17 waste fragments including a large flake, together with 13 sherds of Early Bronze Age pottery. None of this material is stratified and nothing has been published except for a note in Barrington and Stanton's 'The Complete Caves of Mendip' (1970); Smith and Drew (1975), a paragraph by Norman (1982) and a reference in the Sites and Monuments Record, Ref: 10349 (See Appendix).

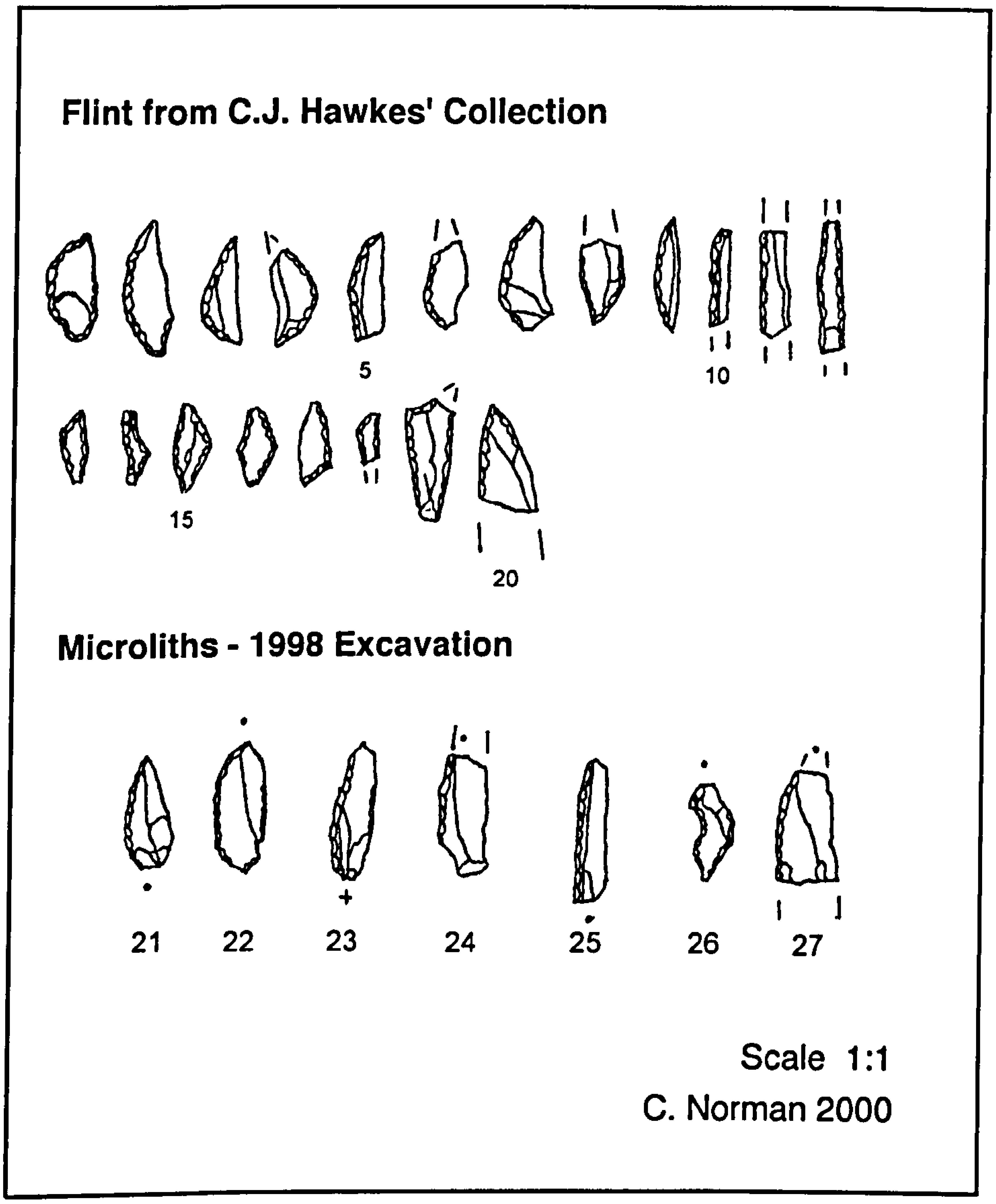


Fig. 26 Flint from Totty Pot, Somerset

	TOTTY POT FLINT (1960's excavation)		
No.	***Description***	***Early/Late***	***Material***
1	Short convex backed	Late	Flint
2	Short convex backed	Late	Flint
3	Short convex backed	Late	Flint
4	Short convex backed	Late	Flint
5	Short convex backed	Late	Flint
6	Short convex backed	Late	Flint
7	Lanceolate	Late	Flint
8	Convex backed	Late	Flint
9	Straight backed bladelet (rod)	Late	Flint
10	Straight backed bladelet (rod)	Late	Flint
11	Straight backed bladelet (rod)	Late	Flint
12	Short lanceolate	Late	Flint
13	Scalene	Late	Flint
14	Scalene	Late	Flint
15	Scalene	Late	Flint
16	Scalene	Late	Flint
17	Scalene	Late	Flint
18	Scalene	Late	Flint
19	Scalene	Late	Flint
20	Tip of larger microlith (broken)	Unclass.	Flint
	Retouched Flint From 1998 Excavation		
21	Lanceolate	Late	Flint
22	Lanceolate	Late	Flint
23	Lanceolate	Late	Flint
24	Narrow microlith (damaged)	Late	Flint
25	Straight backed bladelet (rod)	Late	Flint
26	Convex backed microlith	Late	Flint
27	Retouched blade	Unclass.	Flint

Illustrated flint from the Totty Pot excavations

Aims and Objectives of the 1998 Excavation

The previous excavation failed to establish any stratigraphic sequence within the swallet hole; it failed to establish whether the archaeological finds had been deliberately placed in the swallet hole or whether they had been washed in from an occupation area outside; it also failed to establish any secure association between the microliths and the skeletal material. The radiocarbon date of 8320 ± 69 BP (7541- 7086 cal.BC) on the human bone makes it younger than that of 'Cheddar Man' which is 9080 ± 150BP (8686-7827 cal.BC) (BM-525) (Tratman 1977). The youngest date from Aveline's hole is from stalagmite inside a skull, dated to 8100 ± 50 BP (7301 – 6864 cal.BC) (GrN-5393) (Tratman 1977), which would make Aveline's Hole contemporary and even slightly later than Totty Pot, although the date for the stalagmite (GrN-5393) can only give a *terminus ante quem* for the bone deposited in the cave (Jacobi 1982). Although 'Cheddar Man' is the most complete Mesolithic skeleton in Britain, the four individuals from Totty Pot, which were inadvertently destroyed (pers. comm. C.J. Hawkes), make the swallet hole one of the few burial sites for the Mesolithic period in Britain.

The aims of the 1998 excavation were:

a) to establish whether there was any occupation around the mouth of the swallet hole in an attempt to interpret whether the site had been used for deliberate burial, or whether the finds had been washed in;

b) to put Totty Pot into a wider landscape context and in relation to the other Mesolithic burial sites in the area, e.g. Aveline'e Hole and Gough's Cave and within North Somerset.

Permission was not given by the landowner, the Marquess of Bath, to excavate inside the swallet hole.

Excavation Methodology

A grid in 10m squares was laid out on both the Upper and Lower plateaux and all fieldwork and excavation was carried out within this grid. All spoil from the trenches was sieved.

Geophysical survey

Both resistivity and magnetic susceptibility were carried out on both the Upper Plateau and the Lower Plateaux, but only natural geology was apparent from the results (See Appendix).

Shovel pit testing

Shovel pit testing was carried out on both the Upper Plateau and the Lower Plateau, but no flint was recovered.

Site Geology (Plate H)

The Totty Pot swallet was formed within the Hotwells Limestone, that makes up the Cheddar Cliffs and the level ground of the plateau immediately around the site. This overlies the Chinastone of Cliff Road. Cheddar Gorge to the north west of Totty Pot is comprised of the Clifton Down Limestone, with Goblin Coombe Oolite bordering the area at Wellington Farm in the north and forming a thin semi-circular band to the south of Middle Down Drove. Natural dew-ponds and springs are found within the limestone formation in this area, with a modern stone lined pond and a dew pond approximately 75m south east of the swallet hole (Green 1992; Green *et al.* 1965; Smith and Drew 1975).

The 1998 Excavation

Trenches 1, 2 and 3 (See Appendix for Section Drawings)

Two trenches were laid out either side of the mouth of the swallet hole. Trench 1 to the west (W6/N10) measured 2m x 4m and Trench 2 to the east (E2/N10) measured 2m x 6m. Trench 3 was 5m east of Trench 2 (E7/N10) and measured 1.5m x 2m.

Bedrock was close to the surface in Trenches 1 and 2, together with soils of the Lulsgate Series. Trench 3 was made up of soils of the Nordrach Series which are largely windblown and can be many metres thick. Trench 1 was taken down to a depth of 60cm to bedrock; Trench 2 to a depth of 30cm to bedrock; Trench 3 was taken down to 50cm at the north west corner and sectioned to 90cm in the south west corner. Trench 3 was augered to a depth of 76cm in the middle of the trench and to 96cm in the south west corner. Bedrock was not reached in Trench 3.

Trenches 4 and 5

Trench 4 was opened up on the Lower Plateau (Fig.27) and measured 2m x 2.5m. Trench 5 was a 1m wide connecting trench between Trench 4 and the rock overhang. Trench 4 was sectioned in half, but abandoned at a depth of 30cm. Trench 5 was taken down to the bedrock at a depth of 66cm and environmental samples were taken. Both trenches were opened up in an attempt to find another

Fig. 27 Topographic Survey of Totty Pot, Somerset

entrance into the swallet hole. Both trenches were sterile and a second entrance was not found.

The spoil heap from the earlier excavation was sieved and 5 pieces of retouched flint which included a microlith and a straight backed bladelet (rod) (Fig.26, 25-27) together with adult and juvenile pig teeth were recovered.

Flint (See Appendix for list of finds)
22 retouched tools were recovered from the site, which included 4 retouched pieces from the earlier spoil heap. There were 18 fragments of flint waste, which included Greensand Chert and Quartzite together with some fire-crackled fragments. Also recovered was a tanged and barbed arrowhead from the Beaker period. The total weight of the retouched tools is 17.97g and the total waste is 92.66g From Trenches 1-3 the retouched flint includes 3 lanceolates (Fig.26, 21,23,24), a narrow microlith (Fig.26, 22), a retouched blade (Fig.26, 25), a straight backed bladelet (rod) (Fig.26,26) and a convex backed microlith (Fig.26, 27). All the tools that were recovered, except the Beaker arrowhead, indicate the later Mesolithic period.

Non-flint finds
1 nodule of quartzite; 2 sherds of Roman pottery; 3 juvenile & adult pig teeth; 39 fragments of bone including domestic cow, fox and rabbit (earlier spoil heap), together with 2 pieces of stal (stalagmite which is also found within the swallet hole) and minute fragments of charcoal from the lower plateau. (See Appendix for list of finds).

Interpretation
Totty Pot is unusual in the Cheddar Gorge and Burrington Combe areas, as it is the only known swallet hole on Mendip that has evidence of human use. The other sites used by humans are either caves or rock shelters which have easier access. The 1998 excavation did not have the landowner's permission to excavate what might be a blocked entrance next to the shaft or within the cave itself, although access to the swallet was afforded by a caving ladder into the shaft, where a few samples of animal bone were recovered from the roof of the cave. There are still deposits within the cave.

Around the mouth of the swallet hole, the excavation produced no evidence of occupation, pits or temporary shelters and little evidence of charcoal, although there was a small spread in Trench 2, but it was not dense enough to suggest a hearth. There was no stratigraphy within the trenches, due to the bedrock being close to the ground surface in Trenches 1 and 2 (see Appendix). Of the sixteen retouched tools, eight are from the later Mesolithic period, although it would be difficult to suggest that they were recovered from sealed contexts. The area has never been ploughed and the soil depth was thin immediately around the swallet hole, although the three microliths recovered from Trench 3, which consisted of deep Nordrach series soils, came from undisturbed deposits. The seventeen fragments of waste and the quartzite nodule is not enough in quantity to suggest that knapping was carried out on the site and the microliths are more likely to have been hunting losses, although a little flint waste was recovered from both the 1998 and the earlier excavation. The waste is more likely to have resulted from the re-sharpening of tools. It is possible to say, however, that there is a distinctive late Mesolithic presence both from within the swallet hole and from around its mouth. The recovery of seventeen retouched tools, half of which diagnostically belong to the later Mesolithic period is enough to suggest that Totty Pot was a chosen place of activity, albeit, perhaps not for flint knapping, but the presence of three fire-crackled flint fragments is enough to hint that maybe fire had been used on the site. On the other hand, it could just as easily suggest that fire-crackled flint had been brought into the vicinity from elsewhere.

There is no obvious continuity of use of the site from the Mesolithic, until the Beaker period, with the Beaker arrowhead and two spalls, which are probably the waste products of tool manufacture, otherwise the flint recovered from around the mouth of the swallet suggests an isolated Mesolithic presence. However, the presence of microliths, Beaker arrowhead and Roman pottery suggest that Totty Pot was a favoured place and may have been in use over a considerable period of time. The weather can be severe at a height of 245m and it is not difficult to see why the area may not have been used on a more permanent basis. Until the cave itself is further excavated it is not possible to know whether the bone and flint were deliberately deposited, or washed in from above. The narrowness of the entrance shaft suggests that there must have been another entrance as the human bone was found approximately 10m from the base of the shaft and it seems unlikely that it could have got there by natural means.

The 1998 excavation did not recover any animal bone from the trenches, although bone is still present inside the swallet. The earlier excavation recovered a large quantity of bone from both large and small animals, including aurochs (*Bos* *primigenius)* together with aurochs horn. The presence of aurochs from Totty Pot and from Charterhouse Warren Farm, 4km away, suggests that this was the reason hunter-gatherers were using the area, as well as burying their dead.

Within an 8km radius of Totty Pot, there are both cave sites, at Gough's Cave, Aveline's Hole, Rowberrow Cavern and Ebbor Gorge and open sites at Wright's Piece, Raines Batch, Charterhouse-on-Mendip, Callow Hill, Ebbor Gorge and Priddy where Mesolithic flint has been found (see Chapter 5). Large quantities of flint have been recovered from fieldwalking and there is enough of a microlithic presence to suggest that hunter-gatherers from both the early and later Mesolithic periods were extensively using the uplands of the Mendip Hills for hunting not only deer, but also larger animals such as aurochs.

Discussion

The two sites excavated at Birdcombe and Totty Pot are very different topographically and they were chosen in order to contrast both site location and tool typology. They are approximately 25 km apart (15 miles) with Birdcombe situated at 10m OD. and Totty Pot at 245m OD. The stratigraphic evidence revealed through excavation at Birdcombe showed that the landscape was very different from that of today with alluviation and colluviation processes having filled in and levelled what would have been a steeper hillside slope, a lower valley bottom and a different course for the River Land Yeo. There might have been abundant springs in the prehistoric period, as there are today and the limestone formation of the Failand Ridge suggests that there were caves or rock-shelters suitable for occupation.

The Birdcombe site is conducive to a more permanent stay, where flint knapping took place and fires were lit. Overall, the flint collection does not attest to any specialised activity apart from hunting although it includes eleven scrapers. The presence of twenty three cores confirms that the site was used for tool manufacture. At Totty Pot no evidence of occupation was found, although there was slight evidence of charcoal in Trench 2 and there are three fragments of fire crackled waste. Charcoal fragments were also recovered from the earlier spoil heap. There are strong similarities with the flint typology from both sites, with late Mesolithic rods, together with lanceolates and convex backed pieces being found on both sites.

Totty Pot is also located close to other Mesolithic burial sites in the area, at Aveline's Hole, Burrington Combe, 6km away and Gough's Cave, just over a kilometre away in

Cheddar Gorge. The caves on Mendip were used extensively from the Palaeolithic to the Post Medieval periods (Smith and Drew 1975) with the radiocarbon dates for Totty Pot and Aveline's Hole suggesting that both sites were in use at around the same time. The previous excavation at Totty Pot did not recover any grave goods like those that have been found at Aveline's Hole, although mainly finished tools were recovered from the swallet hole with a noticeable absence of debitage. Whether the microliths can be regarded as some form of grave goods is debatable without further excavation inside the cave, as the typology of the microliths suggests a later date than that from the human bone.

It is difficult to put a more precise interpretation as to how the swallet hole was used in the Mesolithic period, because of the nature of the 1960's excavation and the loss of the human bone that represented the four individuals. The site continues to be a focus for activity throughout the Mesolithic period, but burial appears to have ceased by the time of the late Mesolithic. Burrington Coombe, Cheddar Gorge and Rowberrow Cavern appear to have been important areas on Mendip for Mesolithic activity and burial, but the archaeological evidence is not sufficient to tell us why these cave sites ceased to be the focus of burial from the 9th millennium BP.

No sites have been found on Mendip for the Mesolithic period where there is similarity in quantity and quality of flint on the scale of Birdcombe. However, there are similarities in tool typology between the Birdcombe flint and that from Totty Pot, Hay Wood Cave, Hutton, ST341583 (Everton and Everton 1972) and Gorsey Bigbury, ST484562 (Jones 1938) (C. Norman, pers. comm) (Fig. 28). This suggests that these areas on Mendip could have been used for both hunting or burial by groups that had a more permanent base camp on lower ground such as Birdcombe.

The distribution of Mesolithic sites shown in Fig. 28 shows a range of sites, which includes from Blackstone Rocks, along the north west Somerset coastline, together with a concentration on the higher ground of the Failand Ridge, which continues north to the Avon Gorge, with Birdcombe being the principal site in the area. There is a paucity of sites on the North Somerset Moors between the River Yeo and the Failand Ridge, but this is probably due to the alluvial deposits that have been laid down since the Mesolithic period. Mesolithic activity has been found on higher ground around Barrow Gurney, but the main concentration appears to be on Mendip, which includes also Hay Wood Cave, Hutton, Weston-super-Mare.

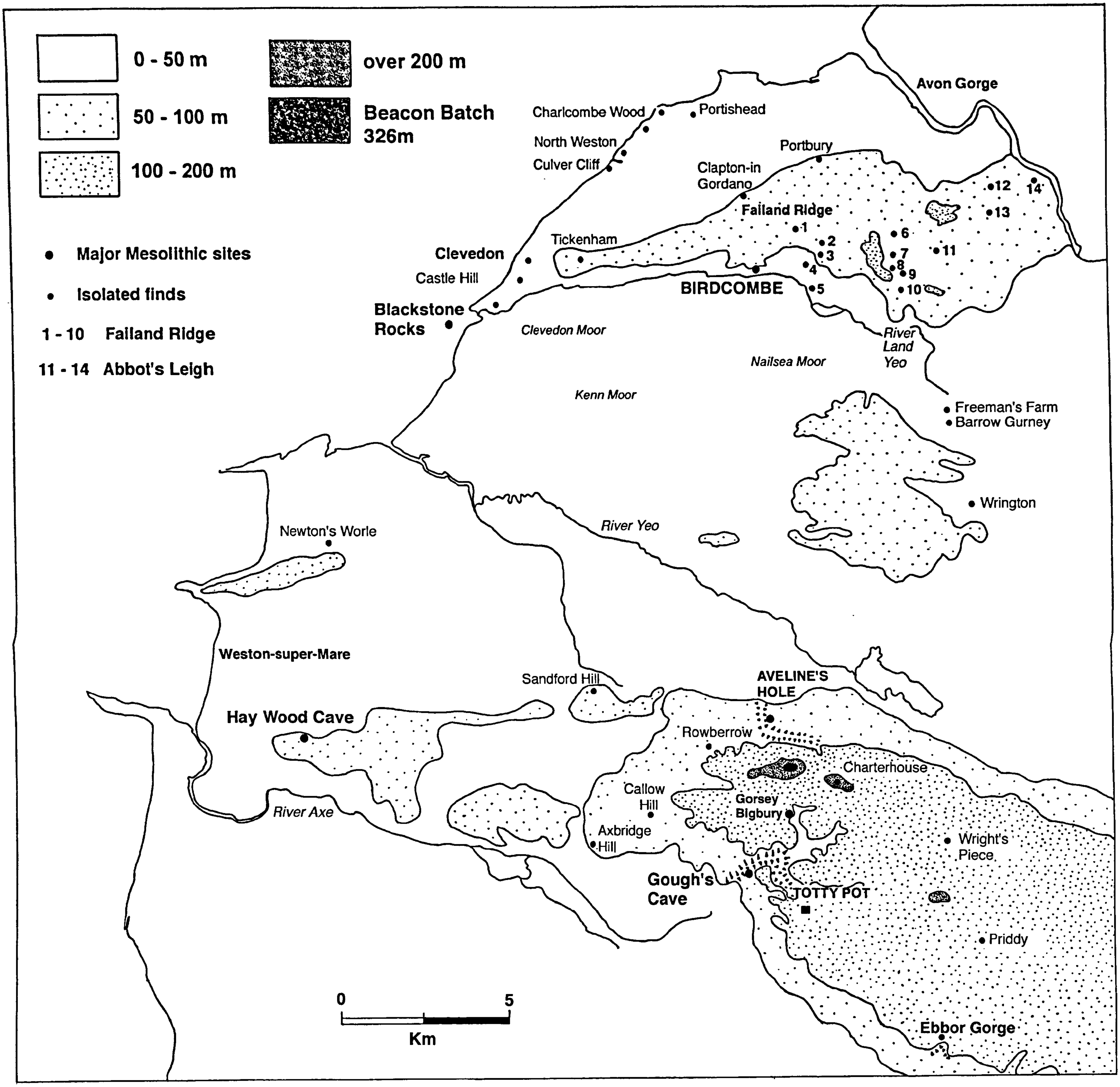


Fig. 28 Mesolithic sites on the Failand Ridge and Mendip, Somerset

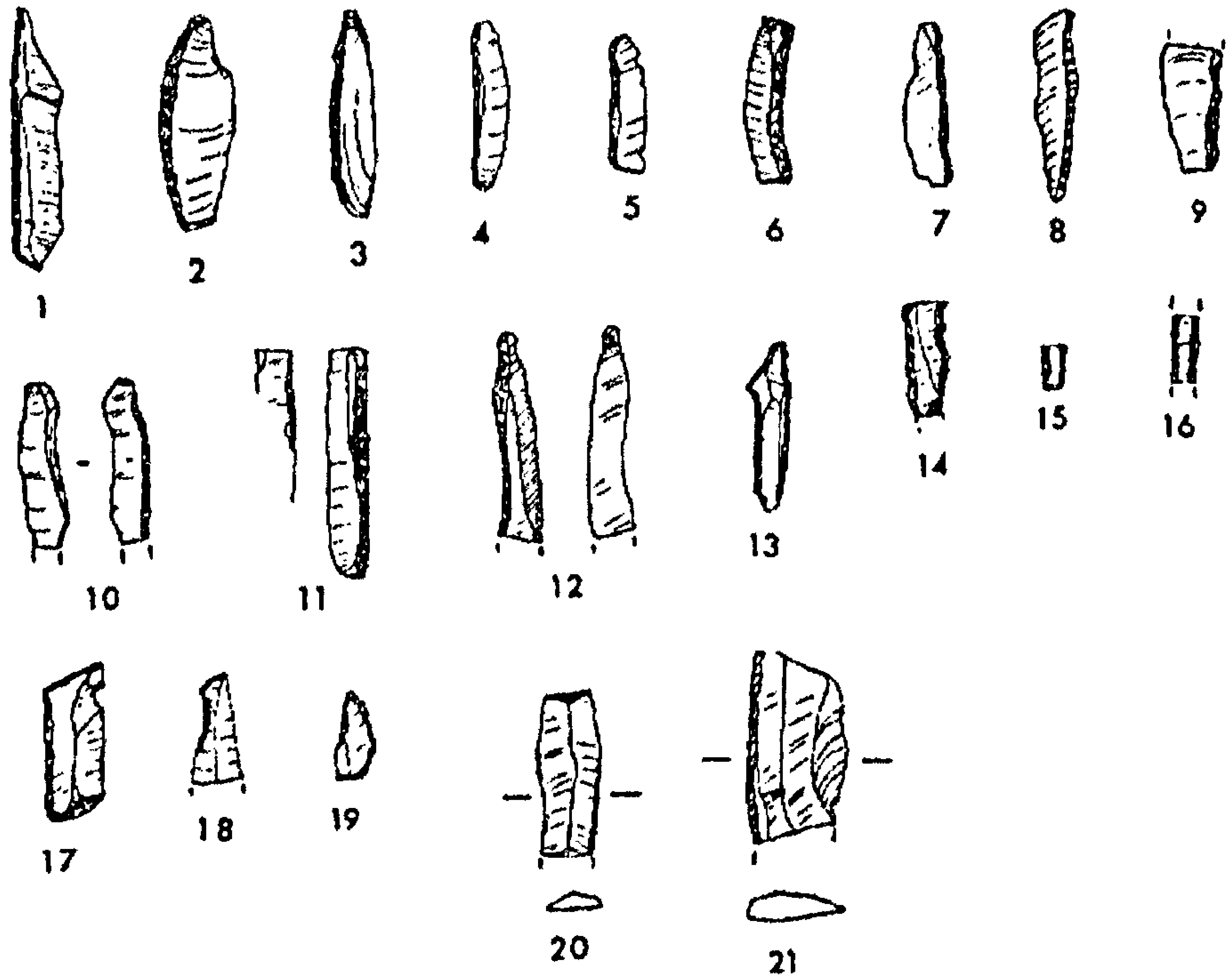


Fig. 29 Late Mesolithic microliths from Hay Wood cave, Somerset (after Everton and Everton 1972)

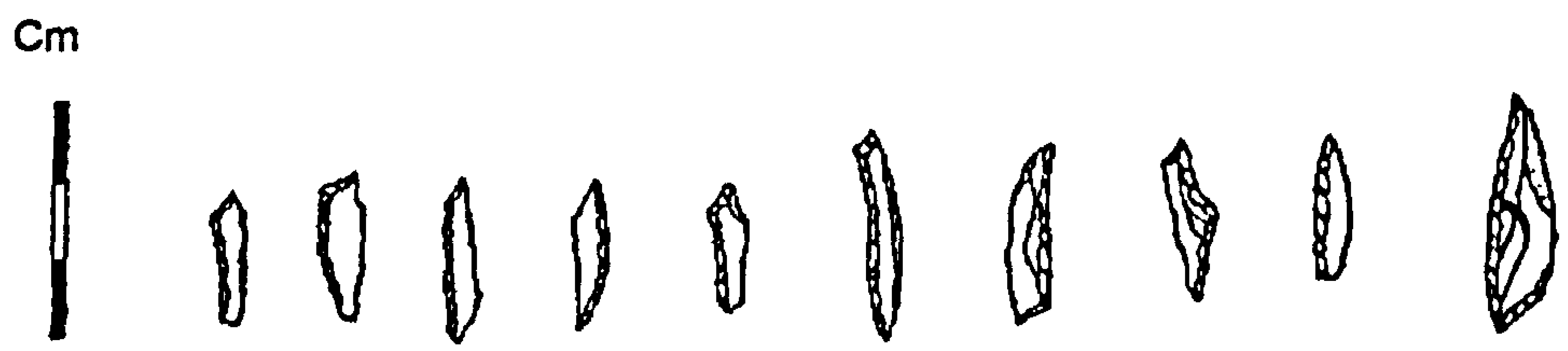


Fig. 30 Late Mesolithic microliths from Gorsey Bigbury, Somerset (after a drawing by Ann Everton)

Hay Wood Cave was excavated in the late 1950's and early 1960's, when human remains, together with microliths were recovered by the Axbridge Caving Group and Archaeological Society. Due to badger disturbance, there was no sealed stratigraphy for the deposits, which included both Iron Age and Romano-British pottery. Although the Mesolithic flint that forms part of the collection contains an obliquely blunted point (Fig.29, 18) from the early Mesolithic period, there are other microlithic forms (Fig.29, 1-16) which include a crescent (Fig.29, 19) which suggest there was a predominantly later Mesolithic presence (Everton and Everton 1972, 18). The excavators believed that the burials belonged to the pre-Roman Iron Age or later, but a recent radiocarbon date on the bone of 4860 ± 65 BP (3373 – 3529 cal.BC) (OxA-5844) (Richards and Hedges 2000) puts it into the Neolithic period.

What is interesting about Hay Wood Cave is that, unlike the other three caves used in the Mesolithic period, there is also Neolithic burial. The stable isotope analysis suggests that the diet of the Neolithic person buried in the cave was terrestrial (Richards and Hedges 2000). Although Mesolithic groups appear to have been using the cave for some sort of activity, it was the Neolithic who were using it to bury their dead. Hay Wood Cave is approximately 15km from the main concentration of Neolithic monument building on Mendip and well outside the main monument building range of dates suggested by Table 6.

The flint typology suggests that Totty Pot and the other Mendip sites may have formed part of an annual seasonal territory, using locations such as Birdcombe as a more permanent, residential site over the winter, providing safety and shelter for flint knapping and the exchange of ideas and resources between groups returning from the summer hunting-grounds of Mendip, which could have included the far western edge of the uplands around Hay Wood Cave. Mendip would have been accessible from Birdcombe for a day's hunting, or a longer stay if necessary. The area shown in Fig.28 could have sustained a variety of resources, from deer and aurochs on high ground, to the coastal and marshland resources on the moors and around Birdcombe and would have been an ideal hunting and gathering territory throughout the Mesolithic period.

The early and the later phases of Mesolithic activity at Birdcombe show that the site was used over considerable period of time. What is not known, however, is whether the Birdcombe site was in continuous use throughout the Mesolithic period, or whether there were periods of abandonment when it was not visited. The archaeological evidence does not suggest reasons for its abandonment. However, Baillie's work on tree-ring chronologies suggests that there might have been some sort of environmental pressure around the time of the transition (Baillie 1995) (Chapter 2) that might have upset the ecosystem in the Birdcombe valley, which was sufficient to cause its abandonment.

In the course of five thousand years when both Birdcombe and Totty Pot were in use, from the beginning to the end of the Mesolithic period, many interpretations could be raised as to their focus and function. What is apparent from the Birdcombe excavation is that there was no further use of the site after the late Mesolithic which is shown by the lack of flint from later phases. The radiocarbon dates suggest that there was a protracted late Mesolithic presence at the site well into the Neolithic period (Table 6). The deep soil deposits that have been laid down since the Mesolithic period in the Wood Ground suggest that the colluviation process might have occurred through woodland clearance in the Neolithic or Bronze Age, causing soil erosion and hillwash from Tower House Woods to cover the excavation area. It is unlikely that hillwash would have occurred to the depth it has without clearance and it is hoped that future palaeoenvironmental work will answer this question.

The evidence recovered from both sites has expanded the existing database for late Mesolithic society in Somerset and has enabled me to put forward a model of territorial movement between the uplands of Mendip and the river valley slopes of the Failand Ridge. The latest radiocarbon date of 4700 ± 50 BP (3637 – 3362 cal.BC) (Beta-147105) indicates that Birdcombe is the latest Mesolithic site in Britain, with hunter-gatherer activity continuing well in the early monument phase of the Neolithic.

Further excavation at Birdcombe would expand this database as it is felt that the 1997 excavation may have only touched the edge of possibly a much larger activity area. Environmental analyses are required on the column taken from the Second River Ground. This would provide information for constructing the local environment relating to the excavation site, as well as an environmental sequence for the Birdcombe valley.

Further excavation within the swallet hole at Totty Pot would establish a much needed stratigraphic sequence inside the cave and may also recover further important Mesolithic burial evidence, which is badly needed in Britain.

PLATE A: Entrance to Aveline's Hole, Burrington Combe, Somerset

PLATE B: The Totty Pot swallet hole, with the shaft covered by an iron plate

PLATE C: The Birdcombe Mesolithic site left of the individual tree

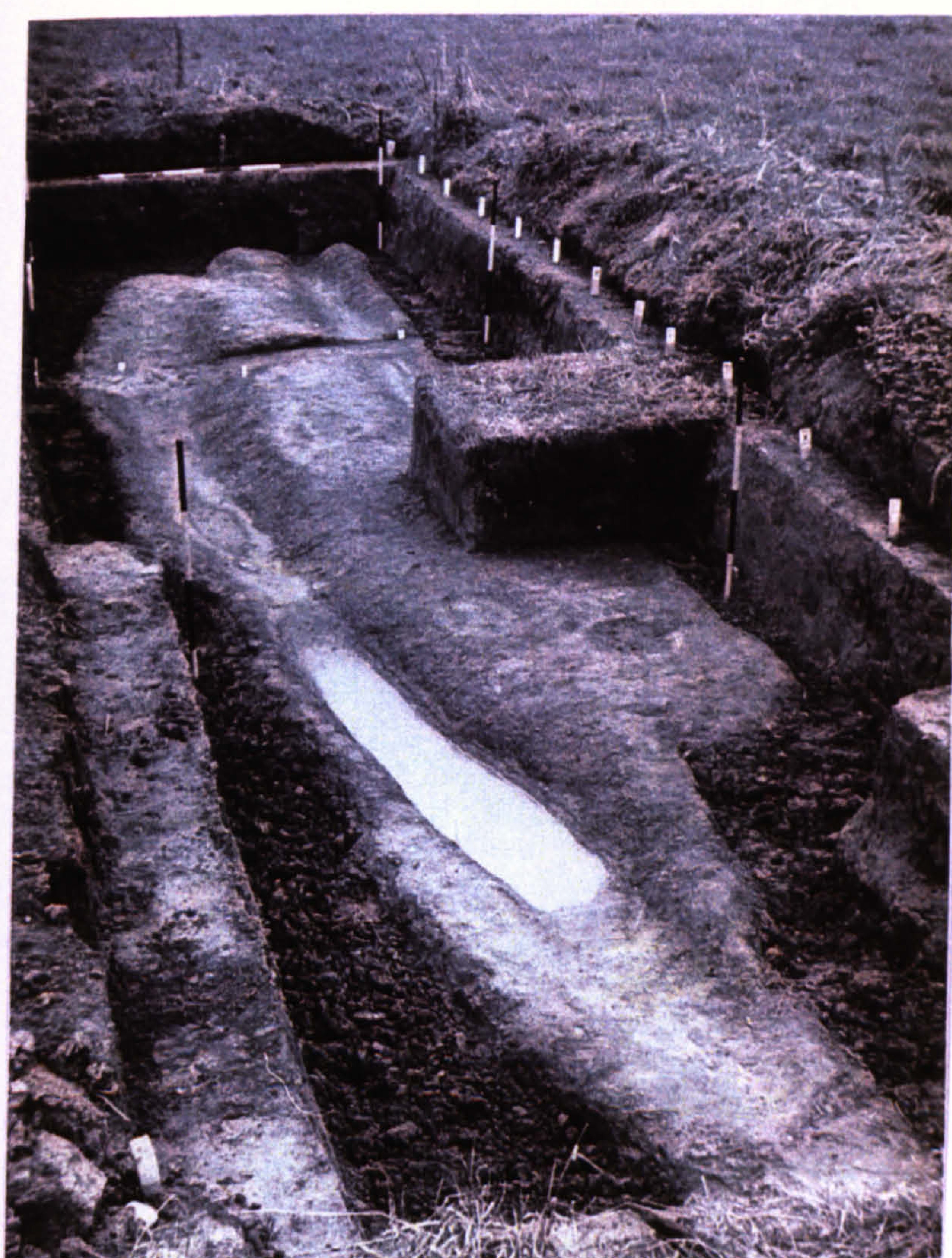
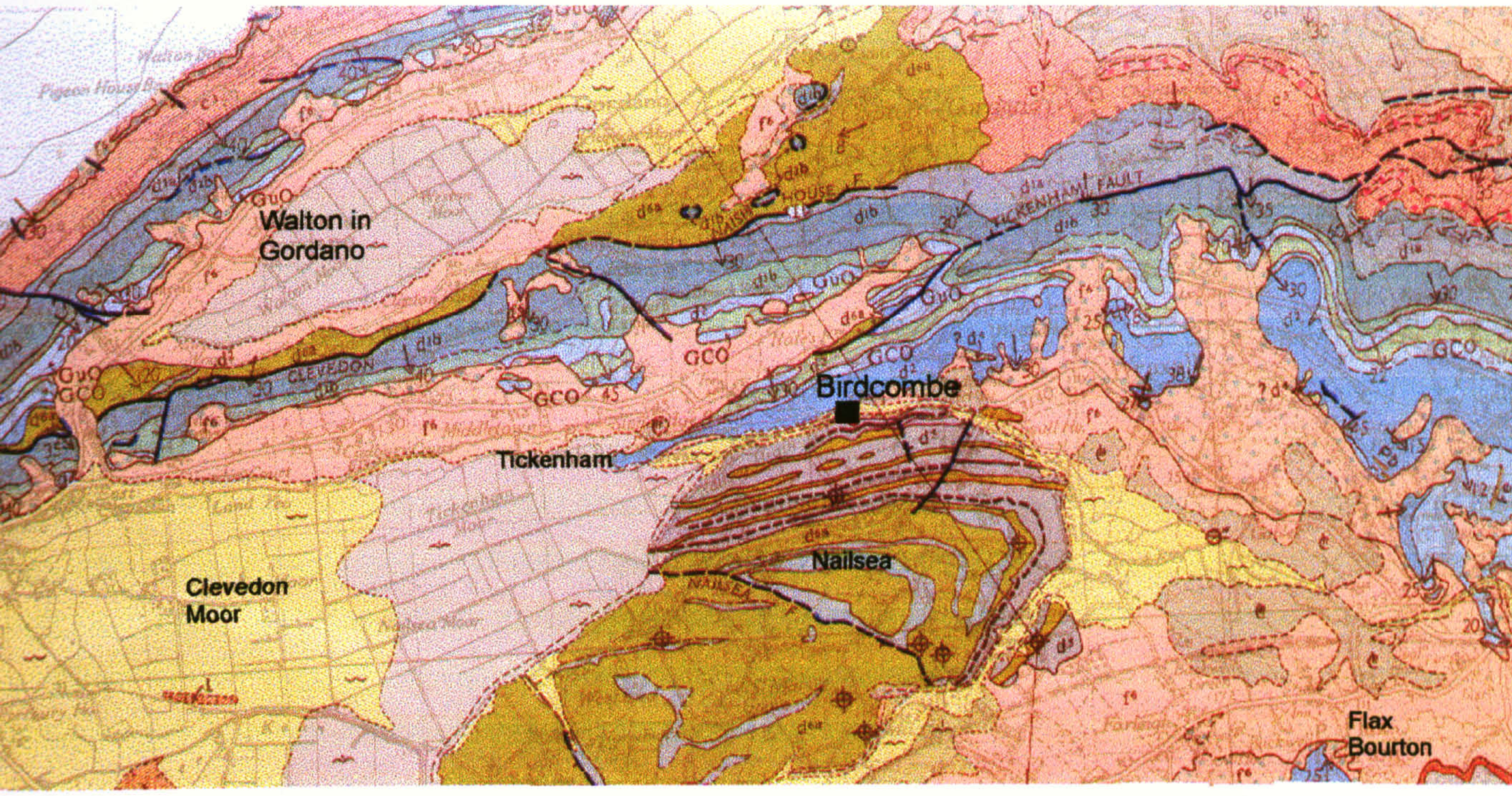


PLATE D: The trench from the 1955 excavation at Birdcombe, showing the 'chipping floor'

PLATE E: The Main Trench D at the end of the 1997 excavation at Birdcombe, Somerset

PLATE F: The bottom of the shaft that leads into the Totty Pot swallet hole



The geology of Birdcombe, Somerset   Scale 1 : 50,000 (Geological Survey Bristol District)

Limestones

- White and Blue Lias
- Hotwells
- Chinastone
- Clifton Down
- Burrington Oolite
- Black Rock
- Lower Limestone Shale

Sandstones

- Butcombe Sandstones
- Old Red Sandstone Portishead Beds

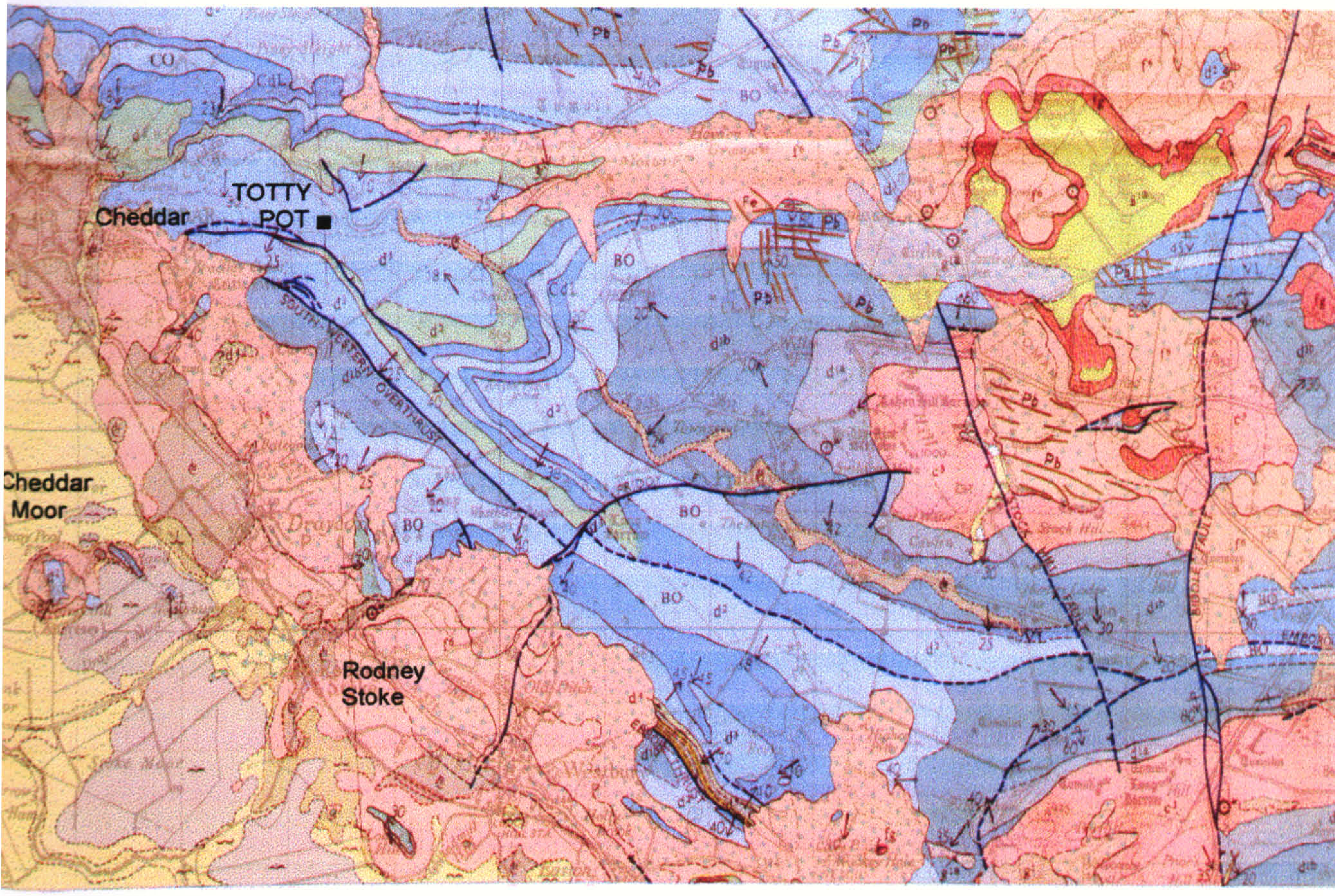
Drift

- Alluvium
- Estuarine Alluvium
- Higher Alluvium (Loam)
- Head

Other

- Keuper Marl
- Dolomitic Conglomerate
- Harptree Bed - Gritty sandstone chert and clay
- Mainly Clay

PLATE G



The geology of the area of Totty Pot, Somerset. Scale 1 : 50,000 (Geological Survey Bristol District)

Limestones

- g1a White and Blue Lias
- d3 Hotwells
- Chinastone
- d2 Clifton Down
- d2 Burrington Oolite
- d1b Black Rock
- d1a Lower Limestone Shale

Sandstones

- BuS Butcombe Sandstone
- c3 Old Red Sandstone Portishead Beds

Drift

- Alluvium
- Estuarine Alluvium
- Higher Alluvium (Loam)
- Head

Other

- f6 Keuper Marl
- f6 Dolomitic Conglomerate
- Harptree Beds - gritty sandstone chert and clay
- fg Mainly Clay

PLATE H

PLATE I: Reconstruction of the Sweet Track, Somerset

PLATE J: Detail of the single oak planks on the Sweet Track reconstruction

CHAPTER 7

THE NATURE OF THE BRITISH EVIDENCE

Introduction

This chapter will discuss the diversity of the database for both the later Mesolithic and the early Neolithic in Britain. There are many problems associated with using European analogies and ethnographic evidence as an aid to interpretation for the transition to farming around the beginning of the 6th millennium BP. Britain had become physically isolated from Continental Europe prior to this time, when the inundation of the North Sea Basin was complete around 7500 BP (Bell and Walker 1992) and with a different and diverse topography from that in Europe, there is no reason to suppose that the transition occurred in the same way. This chapter will also assess the radiocarbon dates that have been used in the past to suggest an overlap between the later Mesolithic and the early Neolithic in Britain and this will include evidence for south west England

The radiocarbon dates in the tables in this chapter have been calibrated with OxCal 3.4 using the probability and dating of Bronk Ramsey (1998); the probability method of Stuiver and Reimer (1993) and the data of Stuiver *et al.* (1998). This is the current calibration curve available at the time of the submission of this thesis. More accurate comparisons can be made between calendar dates from dendrochronology and calibrated radiocarbon dates, rather than raw radiocarbon dates. In this chapter the radiocarbon dates have been expressed as both uncalibrated and calibrated dates, but for comparison purposes calibrated dates have been used.

The Late Mesolithic in Britain

Chapter 4 discussed the evidence for social complexity of both European and British hunter-gatherers and the problems associated with trying to equate the increasing body of palaeoenvironmental information with an insufficient amount of archaeological evidence in order to propose possible mechanisms by which socially complex hunter-gatherers of the late Mesolithic period might have manipulated their environment as a pre-condition to the take-up of farming in the 6th millennium BP. The paucity of the British evidence creates an imbalance between the evidence that we do have and our expectations of what we hope to discover. The number of prehistoric finds that have been recovered from the North Sea in fishing nets, for example, the red-deer antler trawled from the Leman and Ower Banks in the North

Sea and the worked bone and antler from Brown Bank indicate that, prior to inundation, the Dogger Bank area was a large landmass that was extensively used by hunter-gatherers from the Continent and that many early Mesolithic sites have been lost through sea level rise (Coles 1998).

There are submerged forests in the Severn Estuary, both on the English and Welsh sides, that are accessible in the intertidal zone. From two sites at Minehead and Porlock Weir, Somerset, flint has been recovered from these submerged forests (Wymer 1977). Any evidence that might have been available regarding woodland use or management has either been lost or is difficult to retrieve. Mesolithic footprints have been found beneath the peat at Uskmouth, Gwent and are dated to the later Mesolithic period (Aldhouse-Green *et al.* 1992); this shows again that vital evidence has been lost in an area now submerged by the sea.

Coastal sites in Scotland, such as Oronsay (Mellars 1987) and Westward Ho!, Devon (Rogers 1908; 1946; Churchill 1965; Balaam *et al.* 1987) have middens, where large heaps of waste seashells, some including both animal and human bone, together with flint have been found. These types of sites often show repeated periods of activity and can also contain a great deal of both archaeological as well as environmental evidence (Balaam *et al.* 1987).

The quality and quantity of bone and antler artefacts found from early Mesolithic sites such as Star Carr, Yorkshire (Clark 1954) suggest that there may be many such sites waiting to be discovered; however, while recent fieldwork work in the Vale of Pickering, Yorkshire found evidence of other hunter-gatherer activity, there is nothing on the scale of Star Carr (Mellars and Dark 1998).

The British database relies primarily on the survival of flint tools and the debris from their manufacture and it is these artefacts which dominate the archaeological record throughout Britain and Ireland, with a predominance of microliths at the end of the Mesolithic period. At sites such as Kinlock (Rum), Scotland, or Eskmeals, Cumbria (Bonsall *et al.* 1989) they have been recovered in their thousands (Fig.31). They are believed to be the components of a wide range of hunting tools (Mithen 1999), although Clarke (1976) suggests they may also have been used for processing plant foods Regional variations, such as the Horsham point from the south east of England have been discussed in Chapter 6.

The diagnostic tools from the early Mesolithic period and referred to as a "broad blade assemblage" as defined by Clark (1934) and Jacobi (1976) have been discussed in the previous chapter and usually include obliquely blunted points and relatively large microliths such as isosceles triangles. Sites such as Star Carr are referred to as having a Maglemosian flint industry because the microliths are similar to those found in northern Europe. From about 8500 BP a 'narrow blade industry' belonging to the Later Mesolithic containing smaller microliths, which include scalene triangles and rods (backed bladelets), appear in the archaeological record and have no parallels outside Britain. The reasons for this change are not clear, but Jacobi suggests that it was Britain's isolation from Europe that allowed a tool typology to develop without Continental influence, as the trapeze and rhomboid forms that follow the microtriangles in Europe from the 8th millennium BP are absent in Britain (Jacobi 1976). Mithen suggests that one of the reasons for this may have been the increasing growth of dense deciduous woodland, which may have required different hunting tools and strategies (Mithen 1999, 38). Rozoy puts forward the theory that the Mesolithic period is equated with the use of the bow and arrow and sharp tipped microliths, as these are the most important tools for food procurement in this period (Rozoy 1989, 14). Although it is tempting to suggest that microliths appeared in response to the changing environment, Rozoy points out that the microlithisation of armatures in Europe occurred over a long period of time, as much as a millennium, beginning in the pre-Boreal period and that this technical innovation started before any climatic change (Rozoy 1989).

Fischer's experiments with a variety of microlithic armatures from Scandinavian industries supports Rozoy's theory. He has shown that an arrow that was shot using a fifty pound bow could penetrate a wild boar's rib-cage and could kill immediately. He suggests that flint points evolved typologically in an effort to produce an armature that would have optimum penetrative qualities, together with the sharpest cut to induce bleeding, as well as creating the maximum stability for the arrow. He suggests that by manufacturing a microlith using the microburin technique, it produced a stable tip, which was sharper than earlier retouched tips (Fischer 1989).

We cannot escape the fact that hunting with bows would have been extremely effective in the dense Boreal forests of Britain and Europe throughout the Mesolithic period, and the use of lightweight microlithic armatures would have had an efficient and penetrative effect when used to hunt game such as deer or aurochs. The use of the bow would have allowed hunters to stalk deer from a considerable distance, with

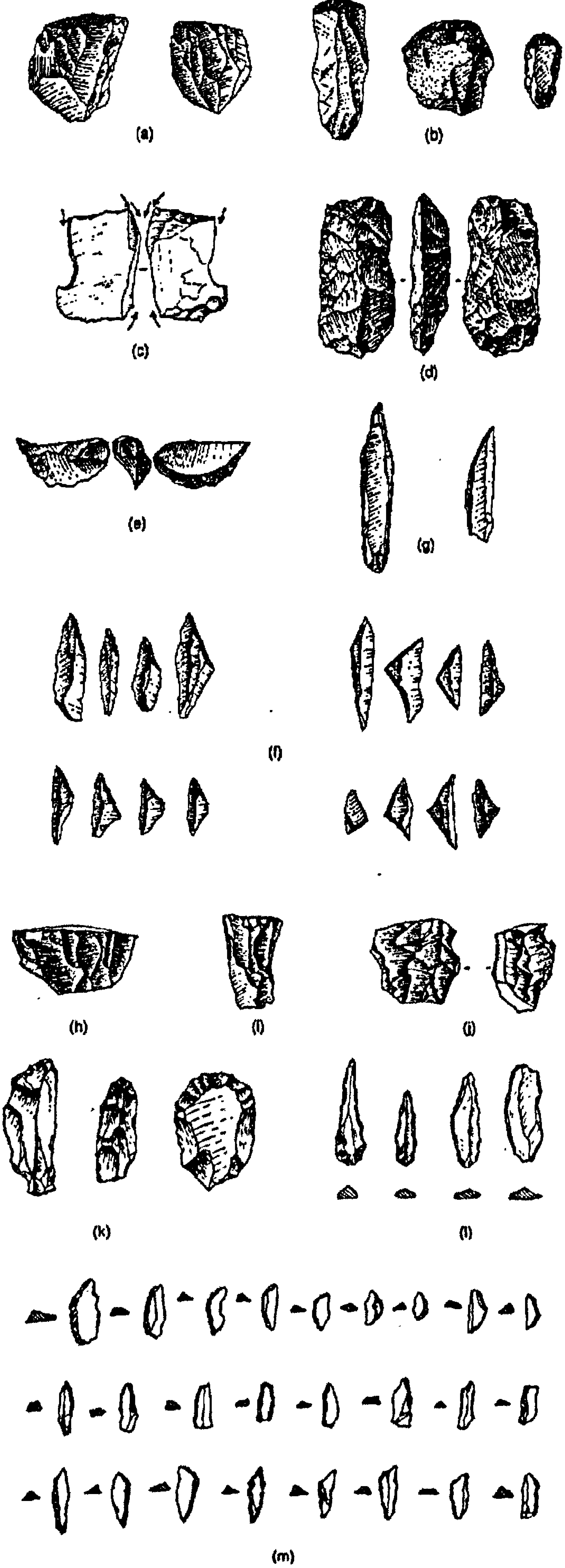


Fig.31 Examples of early and later Mesolithic flint from Star Carr and Kinloch, Rhum.
a) core; b) scrapers; c) burin; d) adze; e) sharpening flake; f) microliths; g) borer; h-j) cores; k) scrapers; l) borers; m) microliths. (Mithen 1999)

the firing of the bow producing very little noise, allowing a second shot if necessary. It would have been an efficient weapon when hunting in woodland.

Microliths are rarely found as part of a Neolithic assemblage, although many have been found in earlier contexts on the same site, such as the Hazleton North long barrow, Gloucestershire (Saville 1990) and at the Hembury causewayed enclosure (Berridge 1986). Alan Saville found microliths from the later Mesolithic period in a pre-cairn context and also within a Neolithic midden. The microliths and the Neolithic flint are spatially separated, apart from those found within the midden, but chronologically there are no radiocarbon dates to link them. The microliths found within the midden are probably residual, whilst those found in the western part of the tomb appear to be from a much earlier context. Although Saville suggests that the Neolithic tomb builders may have had a Mesolithic ancestry, or could even have been aware of the Mesolithic use of the area (Saville 1990) there is nothing stratigraphically to link these two distinctive cultures together. At Hembury, microliths were found all over the site and were not particularly separated by the original excavator, but subsequently Berridge (1986) has drawn attention to them. Like the microliths found at Hazleton, it is more probably coincidental that Mesolithic people were using the same sites as that of Neolithic monument builders, rather than the Neolithic specifically choosing a site that had previously been used by earlier hunter-gatherers.

There are many early Neolithic sites throughout Britain that have evidence of earlier use, but it is not always possible to interpret this as positive evidence of a Mesolithic-Neolithic overlap. The microliths that are found in a Neolithic context are often unstratified, as at Hembury, or in disturbed contexts, such as that at the Rocks Wood rockshelter, Sussex, where burrowing by animals had mixed a microlithic assemblage with that from the Neolithic, so that it was not possible to determine whether Mesolithic activity continued directly into the Neolithic (Harding and Ostoja-Zagorski 1987).

Evidence for substantial structures have rarely been found for the Mesolithic in Britain and Ireland, with the best example coming from the early Mesolithic site at Mount Sandel, Co. Antrim, where a large number of postholes relating to numerous structures were found dated to the early Mesolithic period (Woodman 1985). For the later Mesolithic period the sites at Culverwell of the Isle of Portland, Dorset, showed evidence of hearths, a cooking pit and a limestone pavement with radiocarbon dates from charcoal of 7150 ± 135 BP (6242 - 5730 cal.BC) (BM-473) and 7101 ± 97 BP (6201 – 5774 cal.BC) (BM-960) (Palmer 1989, 255). At the Williamson's Moss site, part of the Eskmeals project in Cumbria, evidence was found of a stone pavement and wooden platform structures relating to the later Mesolithic period (Bonsall, 1989). However, Bonsall does not interpret the paved areas at Williamson's Moss as being residential as there are no other structures, such as post-holes or hearths, related to them. One of the timber structures, however, which has evidence of worked wood, appears to be a raised platform, consisting of oak timbers, birch brushwood, a matting of bark fragments and infilled with stone and earth which was deliberately constructed above a boggy surface. Using comparisons with sites from Denmark, this area is interpreted as being residential and has a pooled mean radiocarbon date (from five determinations of the bark and brushwood) of 5564 ± 26 BP (4457 – 4343 cal.BC), which places it in the later Mesolithic period. The date of 4925 ± 165 BP (4042 – 3362 cal.BC) (UB-2711) for one of the hearths separates it by roughly five hundred years from the later Mesolithic activity related to the timber structure. Although we have another example of Mesolithic and Neolithic activity on the same site, it is chronologically separated in time (Bonsall *et al.* 1989).

It is the flint, therefore, that dominates the archaeological record for both the early and later Mesolithic periods. Attempts have been made to derive site activities and settlement patterns from the distribution of tool types and debitage (Mellars 1976). Mellars interpreted data from selected sites in England as falling into three classes: class A sites where microliths dominate by greater than 80%; class B sites where microliths make up only 30-60% of the assemblage and class C sites that are dominated by scrapers. He found that class B sites were the most common as they were found within different topographical ranges, such as coastal sites, uplands and lowlands and Mellars interprets them as winter base camps where hunter-gatherer groups congregated. The class A assemblages were considered as summer hunting camps and only three sites were considered to be scraper dominated. However, Mellars was selective in choosing the data and no sites from the south western peninsula were in included in the study. Barton's work also suggests that tool types can be distinguished in relation to site function and topography. He has found that lowland sites have more diverse toolkits than those on higher ground which tend to be specialised hunting equipment (Mithen 1999).

It should be emphasised that stone tools represent only a fraction of the material that would have been available on hunter-gatherer sites. The difficulties with studies of this kind is that they show a tendency to allocate functions to tool types that we have no way of proving are the correct interpretation. Clarke's suggestion (1976) of microliths being used for plant processing should not be ignored and the presence of scrapers does not always necessarily imply skin working, as the micro-wear analyses on tools from Star Carr showed that many different functions could be allocated to different tool types and the function of the majority of the microliths examined remained unclear (Dumont 1989). Whilst large lithic assemblages and features such as hearths, pits and timber structures may suggest repeated visits to a site by hunter-gatherer groups, radiocarbon dating cannot always make chronological distinctions between these activities (Mithen 1999).

The Early Neolithic in Britain

Alasdair Whittle's concept of the early Neolithic shows that the importance of descent, origins, ancestry and communal and social relations are only in part linked with domestication and he suggests that we should not "equate the Neolithic uniquely with mixed farming, nor necessarily with sedentary existence" (Whittle 1999, 59). Whittle argues for a strong continuity in economic terms with the preceding Mesolithic and suggests that the early Neolithic had a similarity with a Mesolithic lifestyle with continuing mobility and hunting, but also the introduction of new forms of burial, different artefacts and limited woodland clearance that distinguishes it from a purely hunter-gatherer lifestyle (Whittle 1996). The evidence for a fully-fledged agricultural system at the beginning of the Neolithic is difficult to see in the archaeological record in Britain and as previously discussed in Chapter 4, Moffett *et al.* (1989) suggest that the palaeoenvironmental evidence does not allow for full sedentary farming until the Bronze Age. However, there are sites in Ireland and Scotland which suggest that cereals might have been grown and stored on a greater scale than suggested by Moffett *et al.* (1989).

The Scord of Brouster on Shetland is a Neolithic site that has house structures and adjacent field systems where the remains of charred barley have been recovered from the house structures. The cereal pollen indicates that the crop was grown at the site. There is also evidence of stone ploughshares. The main crop was 6-rowed hulled barley, but there is also a large number of non-crop species and chaff from the lynchets where ash had been spread on the fields. The barley was processed at the settlement. The cereals at the settlement provided the main food source (Whittle *et al.* (1986).

The large quantity of cereal grains (20,000 grains), which includes emmer wheat (*Triticum dicoccum),* from the Balbridie timber hall has been dated to 4725 ± 160 BP (3936 – 3030 cal.BC) (GU-1421). Cerealia has also been found in the turves associated with the structure. Rowley-Conwy (2000) has suggested that the large quantities of grain found within the timber hall were probably stored above ground within the building and became charred when the building was destroyed by fire.

The Lismore Fields, Buxton, has two rectangular buildings that were destroyed by fire and which contained large numbers of emmer wheat (Rowley-Conwy 2000). Both Rowley-Conwy (2000) and Jones (2000) suggest that Balbride and the Lismore Fields provide good evidence for the storage of cereals and that even in marginal areas, such as the Scord of Brouster, cereal growing and processing was being carried out on a considerable scale.

The radiocarbon dates from the Céide Fields, Co.Mayo, suggest that the field systems may be earlier than the Neolithic. The Céide Fields cover 12 km^2 in Co. Mayo and are preserved by a covering of blanket bog. The dates for the pine trees from the peat suggest that the fields were abandoned by 4500BP and pollen analysis also supports this view (Caulfield *et al.* 1998).

Evidence for ploughing can be found in the pattern of ard marks that have been preserved beneath the South Street long barrow, near Avebury, Wilts. The grooves are 15cm deep into the subsoil and show a sequence of cultivation, followed by reversion to grassland, prior to the construction of the tomb (Fowler 1971; Thomas 1991). Even if the ard marks had a ritual function, Rowley-Conwy (2000) suggests that they do at least confirm that ploughing was being carried out in some form before the tomb was built.

The Scottish and Irish examples above indicate there is evidence of a more intensive agricultural system in some areas than is suggested by Moffett *et al.* (1989). Rowley-Conwy's recent study (2000) indicates that storage of grain may have been on a greater scale than previously thought and that the evidence is not being found in Britain because of taphonomic problems.

However, although the above evidence is valid, it is piece-meal and cannot be regarded as a normal occurrence throughout Britain although it does show that in some areas, cultivation and storage was on a large scale and this evidence cannot be ignored, especially if Rowley-Conwy is correct in his assumption that it is taphonomic factors that are preventing the recovery of this evidence (2000).

The early Neolithic in Britain is principally seen in enclosures, as we have little settlement evidence on the scale of the *LBK* (*Linearbandkeramik*) in north west Europe. It is generally accepted that the date for the earliest Neolithic house at Ballynagilly, Co. Tyrone, of 5745 ± 90 BP (4800 – 4361 cal.BC) (UB-305) is now insecure, as the sample used for the dating was based on charcoal of uncertain origin (Woodman 2000, 233). The timber hall at Balbridie, with its date of 5160 ± 70 BP (4218 – 3792) (GU-1038) may be the result of an 'old wood effect' (Baillie 1982; Williams 1989) but Fairweather and Ralston (1993) confirm that the date for the carbonised grain of 4745 ± 160 BP (3936 – 3030 cal.BC) (GU-1421) is integral to the timber structure.

Thomas takes an alternative view to our understanding of Neolithic houses and questions why the longhouses of the *LBK* should be regarded as the norm, whereas in many parts of north west Europe they should be regarded more as a statement of a new social identity. He states that houses are wrongly presumed to be a stable element in society, but that much of the British evidence suggests more temporary structures. He regards the early Neolithic as a shifting society and that enclosed farms and field systems did not come until the Bronze Age. Thomas suggests that settlement was highly variable throughout Britain and Europe and the more substantial buildings that have been found are more likely to reflect communal activities of a group, rather than domestic use and that timber houses reflect a minor element in the Neolithic (Darvill and Thomas 1996). The timber structure at Balbridie was a substantial longhouse measuring 24m by 12m. Even if this kind of building was a minor element in the Neolithic, its' structure was sufficiently large to have survived in the archaeological record and the contents of the charred grain is as Rowley-Conwy suggests (2000) indicative of cereals being grown on a major scale elsewhere.

Although we have evidence of late Mesolithic occupation sites, the evidence for Neolithic settlement between 5500 – 5000 BP is sparse or even totally absent. We are, therefore, comparing the domestic sites of the late Mesolithic with the ceremonial sites of the early Neolithic. This may make such comparisons dubious. We do not have a phasing out of microliths on late Mesolithic sites, or a gradual adoption of a different technology. The majority of hunter-gatherer sites in south west England at the end of the Mesolithic period do not show any continuity into the Neolithic period, although there are many Neolithic sites which show that hunter-gatherers had used the same site previously, as at the Hazleton long barrow in Gloucestershire. Microliths have been found at the Gorsey Bigbury henge site on Mendip, albeit within a Beaker context (ApSimon 1949-50). At the causewayed enclosure of Hambledon Hill, Dorset, there are Mesolithic flints (Mercer 1980; 1988), but although these examples have evidence of earlier activity, none of them are linked in time or space to the later Neolithic activity and it is probably coincidental that Neolithic people chose the same sites as Mesolithic hunting groups.

Although the emergence of monuments in the first half of the 6th millennium BP, suggests a change in both society and economy, with domesticated animal bone and carbonised cereal grain being found as deliberately placed deposits from causewayed enclosures, there is still a hunting element within some of the deposits in the form of a variety of wild animal bone, as at Windmill Hill (Smith 1965). Although evidence of pits, hearths and postholes have been found at the Hembury enclosure, there is no other suggestion that the early use of the site was either permanent or wholly domestic (Liddell 1935). Hunting still appeared to be an important element in the Neolithic period, but perhaps the new leaf shaped arrowheads were more effective against humans. The large quantities of arrowheads from early Neolithic sites such as Crickley Hill, Gloucestershire (Dixon 1988) and Carn Brea, Cornwall (Mercer 1981) suggests that the period around the time of the transition may not have been peaceful.

This brings us to the question of how reliable or even relevant it might be to use radiocarbon dating in order to try and interpret a period in time when the archaeological evidence does not fit exactly into a specific chronological phase. Radiocarbon dates have been used, often without question, to suggest an overlap between the late Mesolithic and early Neolithic in both Britain and Ireland. This kind of exercise is fraught with problems, partly because of the security of some of the samples and partly because we want to find an overlap and will, therefore, accept those anomalous dates that may be completely out of range with the rest of the dating material (Woodman 2000, 225).

However, at Hazleton North Saville rejects the two dates from human bone that are out of range with the rest of the cluster, namely OxA-912 and OxA-383 (Fig.32). The date from OxA-383 appears to be unconnected to the rest of the dating sequence and is treated as an anomaly. OxA-912 has an overlap with the rest of the sequence, but appears as an outlier with the rest of the dates and is also treated as an anomaly (Saville *et al.* 1987).

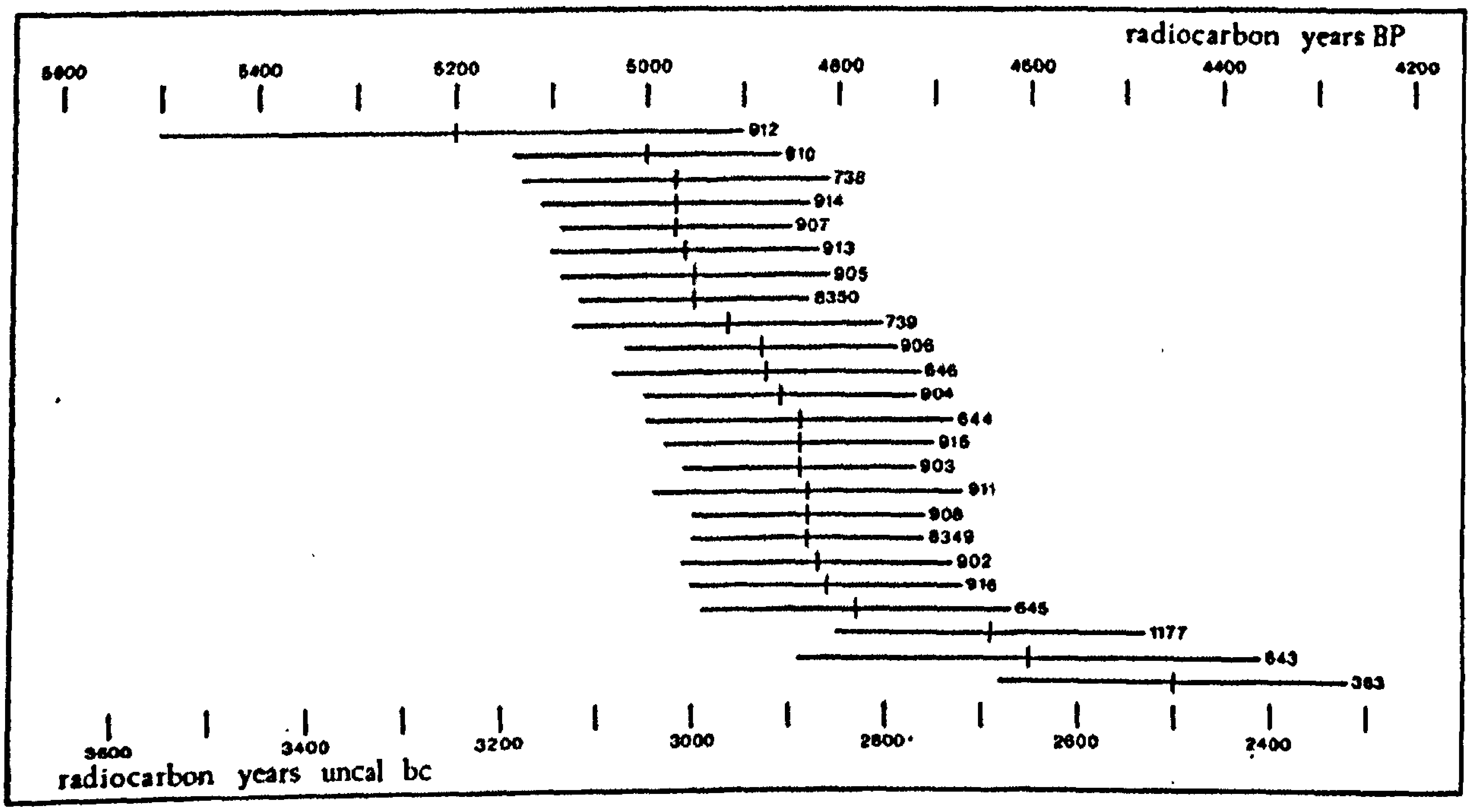


Fig. 32 Diagram of Hazleton North radiocarbon dates (in radiocarbon years BP) arranged in order of their chronology in mean radiocarbon years. (Saville 1999, 239)

Woodman is extremely critical of the misuse of radiocarbon dates and points out that by pulling dates either backwards or forwards in time, they cannot be used to justify specific events (Wodman 2000, 224). He warns that some early Neolithic dates in Ireland, such as those for Ballynagilly, Co. Tyrone and Carrowmore, Co. Sligo may not be secure.

The early radiocarbon dates obtained by Burenhult (1984) from the Carrowmore megalithic cemetery that might suggest a Mesolithic date, have been criticised by

Caulfield (in Burhenhult 1984) and Woodman (in Burenhult 1984; 2000) on the grounds of ambiguous interpretation of the dates. The date of 5240 ± 80BP (Lu-1441) from Grave 7 came from the central chamber which was very disturbed and Burenhult admits that the finds were in a secondary position, although the charcoal for dating came from a post-hole that was intact (Burenhult 1984). Grave 4 was the smallest grave and the date of 5750 ± 85 BP (Lu-1840) comes from charcoal beneath an orthostat in the central cist. The problem with the dating from Grave 4 is that some of the other dates from the central cist belong to the Iron Age (260 ± 44 AD Lu-1811). Caulfield correctly points out that if we are not critical of all the dates, then they must carry equal weight (in Burenhult 1984).

Table 4 is a list of the latest Mesolithic and early Neolithic radiocarbon dates for England. Table 4 does not include sites from Wales, Scotland or Ireland. It was decided to concentrate on English sites only. The Irish Mesolithic is different from the British Isles in its tool typology and chronology. Ireland was separated from the British Isles between 11,000 and 10,000 BP where the Mesolithic developed in a different way to that in Britain. Many of the Irish sites are coastal or riverine, with few inland sites. There is, therefore, an emphasis on a coastal or riverine economy. Wild pig dominates the faunal evidence as few red deer bones have been found on Mesolithic sites in Ireland and the lack of a hunting resource may have had an effect upon site location. The tool typology of the Irish Mesolithic shows a broad blade industry at the end of the Mesolithic period, which includes Bann flakes, as opposed to a small, geometric microlithic element (narrow blade) from English sites. The Irish Mesolithic, in both its economy, site location and tool typology appears to have developed in an isolated and different way to that in Britain and it was for these reasons that the radiocarbon dates were not included in Table 4.

The Mesolithic sites on the western Scottish islands, including Oronsay, which have radiocarbon dates that appear to overlap into the early Neolithic are also not included in the above list. The Scottish sites are geographically remote from those in England and their isolation from the rest of the British Isles suggest that they should be regarded as outliers with the rest of the data.

Elizabeth Williams (1989) rejects several dates from Table 4 (denoted by *) on the grounds that they are single dates with no other source of contextual corroboration. She includes Lambourn, Church Hill, Thirlings, Horslip, Fussell's Lodge and Black Patch (Williams 1989, 511) She also rejects Wawcott I on the grounds of postdepositional disturbance. Williams rejects the early cereal pollen dates for Oakhanger on the grounds that the sample was contaminated by more recent deposits (Williams 1989, 515). See Table 5.

Roger Jacobi also rejects the dates (demoted by + Table 4) for Oakhanger as being insecure as the radiocarbon sample came from a bulk sample of charcoal; from Dunford Bridge and Wawcott I as insecure, as they were taken from a peat interface sample and the date may not necessarily be associated with the archaeology; the Wawcott III sample coming from charcoal from the top of a tree-throw which does not suggest secure stratification (R. Jacobi pers. comm.).

If the sites rejected by Jacobi and Williams are taken out of Table 4, there is an overlap between the later Mesolithic and the early Neolithic in England with Birdcombe which overlaps with some of the earliest Neolithic sites. The interpretation of the dates for Birdcombe have already been discussed in Chapter 6. In order to more accurately compare uncalibrated radiocarbon dates with the calendar dates from dendrochronology, i.e. the Sweet Track and the Post track, the uncalibrated dates in Tables 4 to 7, have been calibrated for more accurate analysis. Further dates from English sites referred to in the text have been included in Table 6, together with the Ballynagilly and Balbridie dates for comparison purposes, although the Ballynagilly sample may be insecure (discussed earlier in this chapter).

The results in Table 6 show, if the earliest date for Ballynagilly is not now accepted (Woodman 2000), the later Mesolithic sites of Birdcombe and Eskmeals overlap with the early Neolithic open site at Broome Heath. Birdcombe and the Whitwell long cairn are roughly contemporary and these dates are then followed by a steady and continuous phase of Neolithic monuments with the Hembury causewayed enclosure, together with long barrow construction at Cannon Hill, Beckhampton Road and Ascott-under-Wychwood. The Post Track and the Sweet Track appear around the time of Eaton Heath, Abingdon, Hazleton and Carn Brea. Broome Heath is seen as the earliest open Neolithic site with the Whitwell long cairn and the Hembury causewayed enclosures as the earliest Neolithic monuments.

The archaeological evidence from the later Mesolithic and the early Neolithic periods suggests there is no mixing of the two cultures, but the radiocarbon dates suggest that Eskmeals and Birdcombe overlap into the Neolithic period. If we accept the latest date for Birdcombe as a secure Mesolithic date, it suggests that hunter-

TABLE 4

Radiocarbon dates for late Mesolithic and early

Neolithic sites in Britain

LATE MESOLITHIC-EARLY NEOLITHIC DATES			
	Radiocarbon yrs BP	Meso/Neo	Sample
Westward Ho!	6585 ± 130	Meso	Q-672
March Hill II	5850 ± 80	Meso	Q-788
Stonewall rock shelter	5770 ± 100	Meso	Q-1143
Thorpe Common	5680 ± 150	Meso	Q-1118
Eskmeals	5509 ± 54	Meso	UB-2712
Broome Heath	5424 ± 117	Neo	BM-679
Birdcombe	5420 ± 60	Meso	Beta-147106
+*Oakhanger	5380 ± 115	Meso	F-68
+Dunford Bridge	5380 ± 80	Meso	Q-799
Whitwell long cairn	5380 ± 90	Neo	OxA-4176
*Lambourn long barrow	5365 ± 180	Neo	Gx-1178
*Church Hill	5340 ± 150	Neo	BM-181
+Rocher Moss South	5330 ± 100	Meso	Q-1190
Hembury	5280 ± 150	Neo	BM-138
Cannon Hill	5260 ± 110	Neo	HAR-1198
+*Wawcott I	5260 ± 130	Meso	BM-449
*Thirlings	5230 ± 150	Neo	HAR-877
Beckhampton Road	5200 ± 160	Neo	NPL-138
Ascott under Wychwood	5198 ± 225	Neo	BM-835
*Horslip	5190 ± 150	Neo	BM-180
*Fussells Lodge	5180 ± 150	Neo	BM-134
+Wawcott III	5120 ± 134	Meso	BM-767
Eaton Heath	5095 ± 49	Neo	BM-770
*Black Patch	5090 ± 130	Neo	BM-290
Abingdon	5060 ± 130	Neo	BM-351
Hazleton North	5000 ± 150	Neo	OxA-910
Carn Brea	4999 ± 64	Neo	BM-825
Hay Wood	4860 ± 65	Neo	OxA-5844
Hambledon Hill	4740 ± 90	Neo	NPL-76
Birdcombe	4700 ± 50	Meso	Beta-147105

Late Mesolithic (highlighted red) and early Neolithic dates in radiocarbon years BP (Rowley-Conwy 1986; Barton *et al.* 1991, Whittle 1977; Williams 1989)

\+ Dates rejected by R.M. Jacobi (personal communication)
* Dates rejected by E. Williams (1989)

TABLE 5

Late Mesolithic and Early Neolithic dates after insecure radiocarbon samples have been rejected

LATE MESOLITHIC-EARLY NEOLITHIC DATES			
	Radiocarbon yrs BP	Meso/Neo	Sample
Westward Ho!	6585 ± 130	Meso	Q-672
March Hill II	5850 ± 80	Meso	Q-788
Stonewall rock shelter	5770 ± 100	Meso	Q-1143
Thorpe Common	5680 ± 150	Meso	Q-1118
Eskmeals	5509 ± 54	Meso	UB-2712
Broome Heath	5424 ± 117	Neo	BM-679
Birdcombe	5420 ± 60	Meso	Beta-147106
Whitwell long cairn	5380 ± 90	Neo	OxA-4176
Hembury	5280 ± 150	Neo	BM- 138
Cannon Hill	5260 ± 110	Neo	HAR-1198
Beckhampton Road	5200 ± 160	Neo	NPL-138
Ascott under Wychwood	5198 ± 225	Neo	BM-835
Eaton Heath	5095 ± 49	Neo	BM-770
Abingdon	5060 ± 130	Neo	BM-351
Hazleton North	5000 ± 150	Neo	OxA-910
Carn Brea	4999 ± 64	Neo	BM-825
Hay Wood	4860 ± 65	Neo	OxA-5844
Hambledon Hill	4740 ± 90	Neo	NPL-76
Birdcombe	4700 ± 50	Meso	Beta-147105

Later Mesolithic sites highlighted in red

TABLE 6

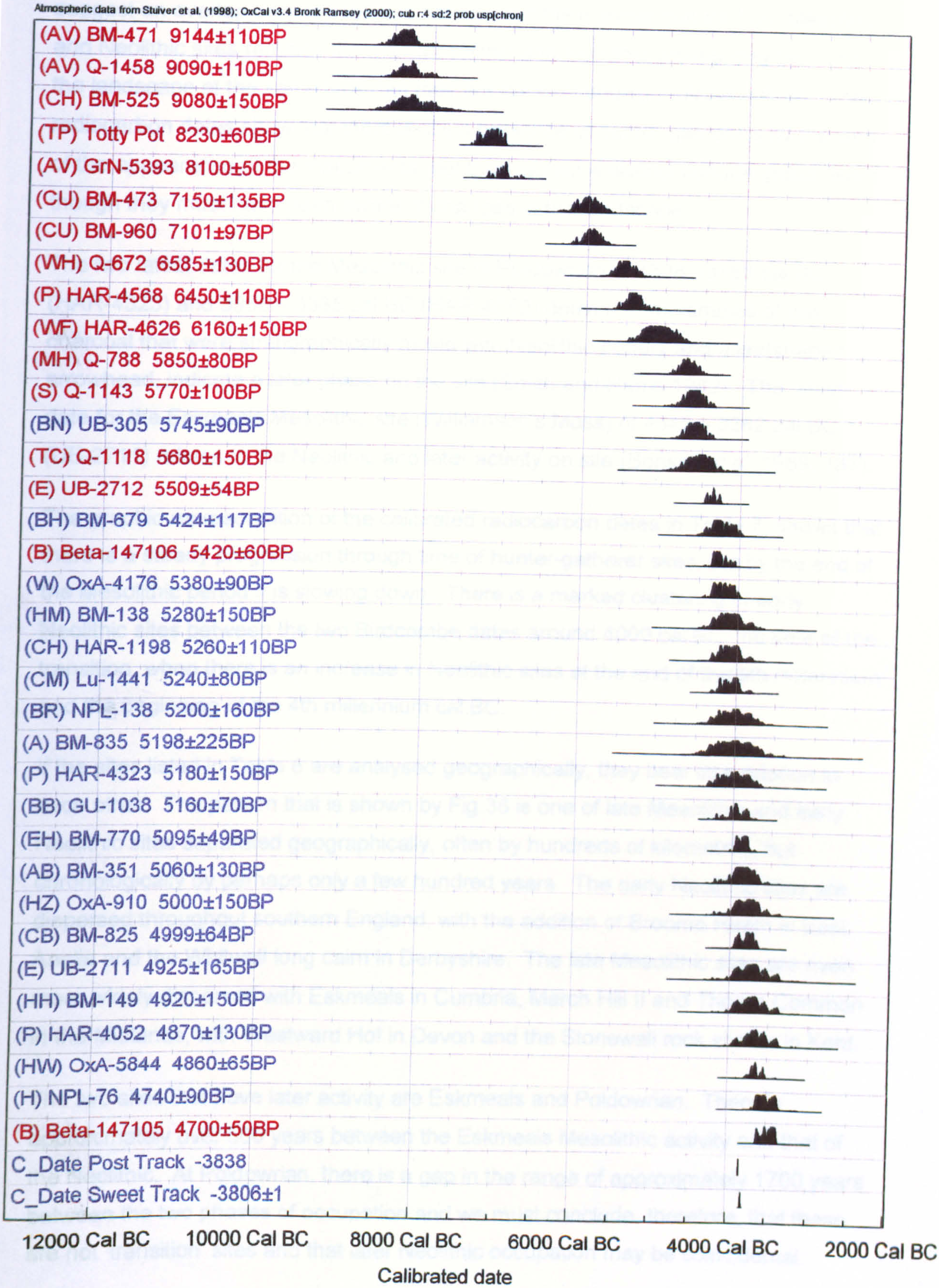
SITE	CODE	LAB SAMPLE	RADIOCARBON YRS BP	CALIBRATED BC
Aveline's Hole	AV	BM-471	9144 +/- 110	8684 - 8028
Aveline's Hole	AV	Q-1458	9090 +/- 110	8554 - 7967
Cheddar Man	CH	BM-525	9080 +/- 150	8686 - 7827
Totty Pot	TP	Unpublished	8320 +/- 69	7541 - 7086
Aveline's Hole	AV	GrN-5393	8100 +/- 50	7302 - 6864
Culverwell	CU	BM-473	7150 +/- 135	6242 - 5730
Culverwell	CU	BM-960	7101 +/- 97	6201 - 5774
Westward Ho!	WH	Q-672	6585 +/- 130	5726 - 5303
Poldowrian	P	HAR-4568	6450 +/- 110	5618 - 5149
Windmill Farm	WF	HAR-4626	6160 +/- 150	5470 - 4718
March Hill II	MH	Q-788	5850 +/- 80	4904 - 4499
Stonewall rock shelter	S	Q-1143	5770 +/- 100	4846 - 4362
Ballynagilly	BN	UB-305	5745 +/- 90	4800 - 4361
Thorpe Common	TC	Q-1118	5680 +/- 150	4897 - 4245
Eskmeals	E	UB-2712	5509 +/- 54	4456 - 4249
Broome Heath	BH	BM-679	5424 +/- 117	4492 - 3979
Birdcombe	B	Beta-147106	5420 +/- 60	4358 - 4047
Whitwell long cairn	W	OxA-4176	5380 +/- 90	4433 - 3981
Hembury	HM	BM-138	5280 +/- 150	4448 - 3714
Cannon Hill	CH	HAR-1198	5260 +/- 110	4338 - 3798
Carrowmore	CM	Lu-1441	5240 +/- 80	4318 - 3815
Beckhampton Road	BR	NPL-138	5200 +/- 160	4350 - 3653
Ascott-under-Wychwood	A	BM-835	5198 +/- 225	4488 - 3524
Poldowrian*	P	HAR-4323	5180 +/- 150	4338 - 3653
Balbridie	BB	GU-1038	5160 +/- 70	4218 - 3792
Eaton Heath	EH	BM-770	5095 +/- 49	3980 - 3776
Abingdon	AB	BM-351	5060 +/- 130	4220 - 3543
Hazleton North	HZ	OxA-910	5000 +/- 150	4218 - 3382
Carn Brea	CB	BM-825	4999 +/- 65	3960 - 3649
Eskmeals*	E	UB-2711	4925 +/- 165	4042 - 3362
Hazard Hill	HH	BM-149	4920 +/- 150	4036 - 3368
Poldowrian*	P	HAR-4052	4870 +/- 130	3960 - 3365
Hay Wood*	HW	OxA-5844	4860 +/- 65	3773 - 3520
Hambledon Hill	H	NPL-76	4740 +/- 90	3700 - 3351
Birdcombe	B	Beta-147105	4700 +/- 50	3637 - 3362
Post Track				3838 (Dendro)
Sweet Track				3806/7 (Dendro)

(Stuiver *et at.* (1998); OxCal v3.4 Bronk Ramsey (2000)

Later Mesolithic sites highlighted in red

* Mesolithic site with later Neolithic phase

TABLE 7


Atmospheric data from Stuiver et al. (1998); OxCal v3.4 Bronk Ramsey (2000); cub r:4 sd:2 prob usp[chron]
(AV) BM-471 9144±110BP
(AV) Q-1458 9090±110BP
(CH) BM-525 9080±150BP
(TP) Totty Pot 8230±60BP
(AV) GrN-5393 8100±50BP
(CU) BM-473 7150±135BP
(CU) BM-960 7101±97BP
(WH) Q-672 6585±130BP
(P) HAR-4568 6450±110BP
(WF) HAR-4626 6160±150BP
(MH) Q-788 5850±80BP
(S) Q-1143 5770±100BP
(BN) UB-305 5745±90BP
(TC) Q-1118 5680±150BP
(E) UB-2712 5509±54BP
(BH) BM-679 5424±117BP
(B) Beta-147106 5420±60BP
(W) OxA-4176 5380±90BP
(HM) BM-138 5280±150BP
(CH) HAR-1198 5260±110BP
(CM) Lu-1441 5240±80BP
(BR) NPL-138 5200±160BP
(A) BM-835 5198±225BP
(P) HAR-4323 5180±150BP
(BB) GU-1038 5160±70BP
(EH) BM-770 5095±49BP
(AB) BM-351 5060±130BP
(HZ) OxA-910 5000±150BP
(CB) BM-825 4999±64BP
(E) UB-2711 4925±165BP
(HH) BM-149 4920±150BP
(P) HAR-4052 4870±130BP
(HW) OxA-5844 4860±65BP
(H) NPL-76 4740±90BP
(B) Beta-147105 4700±50BP
C_Date Post Track -3838
C_Date Sweet Track -3806±1
12000 Cal BC
10000 Cal BC
8000 Cal BC
6000 Cal BC
4000 Cal BC
2000 Cal BC
Calibrated date

gatherers were lingering well into the Neolithic period. The radiocarbon dates suggest an overlap between the two periods, but the material culture from Mesolithic and Neolithic sites remains distinct. Mesolithic and Neolithic groups may be using the landscape at the same time, but they are not exchanging material culture. The radiocarbon dates show that there is still a presence of hunter-gatherers by the time of the appearance of the monuments, but they remain a distinct cultural group, even though they must have been aware of changes in the landscape.

The two latest dates for the Mesolithic site of Poldowrian of 4338 –3653 cal.BC (HAR-4323) and 3960 – 3365 cal.BC (HAR-4052) derived from samples of oak charcoal that were stratigraphically mixed with Neolithic pottery and a leafshaped arrowhead, indicate a later phase on the site (Smith and Harris 1982). The latest date for the Eskmeals Mesolithic site (Williamson's Moss) of 4042 – 3362 cal.BC (UB-2711) relates to the Neolithic and later activity on site (Bonsall *et al.* 1989, 187).

The graphic representation of the calibrated radiocarbon dates in Table 7, shows that there is a steady progression through time of hunter-gatherer sites, but by the end of the Mesolithic period it is slowing down. There is a marked clustering of early Neolithic sites between the two Birdcombe dates around 4000 cal.BC, the time of the transition, when there is an increase in Neolithic sites at the end of the 5th millennium and the beginning of the 4th millennium cal.BC.

If the sites listed in Table 6 are analysed geographically, they bear little relation to each other. The pattern that is shown by Fig.36 is one of late Mesolithic and early Neolithic sites separated geographically, often by hundreds of kilometres, but chronologically by perhaps only a few hundred years. The early Neolithic sites are dispersed throughout southern England, with the addition of Broome Heath in East Anglia and the Whitwell long cairn in Derbyshire. The late Mesolithic sites are even more widely dispersed with Eskmeals in Cumbria, March Hill II and Thorpe Common in the Midlands, with Westward Ho! in Devon and the Stonewall rock shelter in Kent.

The two sites that have later activity are Eskmeals and Poldowrian. There is approximately over 500 years between the Eskmeals Mesolithic activity and that of the Neolithic. At Poldowrian, there is a gap in the range of approximately 1700 years between the two phases of occupation and we must conclude, therefore, that these are not 'transition' sites and that later Neolithic occupation may be coincidental.

The closest sites geographically and chronologically are Birdcombe and the Post

Fig. 33 Later Mesolithic and Early Neolithic Sites

Track and the Sweet Track (Plates I and J) which are only 48 kilometres apart. Culturally, there is nothing to link the Sweet Track with Birdcombe, but chronologically there may be only a few hundred years between the sites if the oldest date is used. If the youngest Birdcombe date is used, we could question which cultural group was building these trackways. The people who built the trackways must have been in the area some time before their construction to manage the woodland for coppicing or pollarding before they were built. The timber for the Post Track was cut a generation before the Sweet Track. The artefacts found beside the Sweet Track are assumed to have a contextual association with that trackway and not the Post Track and the builders of the Sweet Track, if they are culturally Neolithic, may have come into an area that already had managed woodland and a trackway constructed and they may have made further use of it. Alternatively, the builders of the Post Track may have been a hunter-gatherer group, who later acquired the material culture of the Neolithic by the time they built the Sweet Track.

The interesting point about the Sweet Track compared with the later trackways that were constructed on the Somerset Levels, is that it poses the question as to whether it was wholly functional. There is no evidence of settlement, or field systems either end of the Sweet Track on the higher ground of either the Shapwick Burtle or the lias island of Westhay. This trackway has had more artefacts recovered from its location that the other trackways from later periods on the Levels (Coles and Coles 1986). Its intention was to enable people to cross the wet bog between higher ground and although the constructional design is ingenious, it puts into doubt whether animals would have been able to find secure footing on the narrow oak planking (Plate J) and Coles and Coles have not recognised any passing-places at any length of the trackway that was excavated (Hillam *et al.* 1990,223). The jadeite axe, which is believed to be a deliberate deposit also calls into question the function of this trackway. The pot of hazelnuts, together with numerous leaf-shaped arrowheads could have been deliberate deposits as much as lost or dropped artefacts.

Whether the trackway was functional or had any ritual significance still does not answer the question as to which cultural group constructed it, but the Birdcombe dates suggest that it seems not unreasonable for it to have been indigenous hunter-gatherers as much as farmers.

For the south west of England, we do not have enough radiocarbon dates to be able to make any kind of comparison between late Mesolithic and early Neolithic sites.

The date for 'Cheddar Man' of 9080 ± 150 BP (8686 – 7827 cal.BC) (BM-525) suggests the cave was in use at the end of the early Mesolithic period. The last burial at Aveline's Hole is dated to around 8100 ± 50 BP (7302 – 6864 cal.BC) (GrN-5393) and is contemporary with that from Totty Pot (8320 ± 69 BP (7541 – 7086 cal.BC). They both fall at the beginning of the later Mesolithic period when Britain was separated from the Continent (Table 8).

TABLE 8

Mesolithic cave sites on Mendip, Somerset

SITE	LAB SAMPLE	BP	CAL.BC
(CH) 'Cheddar Man'	BM-525	9080 ± 150	8686 - 7827
(TP)Totty Pot	Unpublished	8320 ± 69	7541 - 7086
(A) Aveline's Hole	GrN-5393	8100 ± 50	7302 – 6864
Hay Wood	OxA-5844	4860 ± 65	3773 - 3520

We do not know the reasons why these caves were abandoned as burial sites in the Mesolithic period, but we assume Totty Pot continued in use throughout the Mesolithic period from the late Mesolithic microliths. The recent dates from the Hay Wood Cave human bone indicates Neolithic burial (Hedges and Richards 2000).

Elsewhere in the south west of England, the following radiocarbon dates that are available for later Mesolithic sites are shown in Table 9.

TABLE 9

Radiocarbon dates for the later Mesolithic period in the south west peninsula

SITE	LAB SAMPLE	BP	CAL.BC
(WH) Westward Ho!, Devon	Q-672	6585 ± 130	5726 - 5303
(P) Poldowrian, Cornwall	HAR-4568	6450 ± 110	5618 -5149
(WF) Windmill Farm, Cornwall	HAR-4626	6160 ± 150	5470 - 4718
(B) Birdcombe, Somerset	Beta-147106	5420 ± 60	4358 - 4047
(B) Birdcombe, Somerset	Beta-147105	4700 ± 50	3637 - 3362

TABLE 10

Radiocarbon dates for the early Neolithic period in the south west peninsula

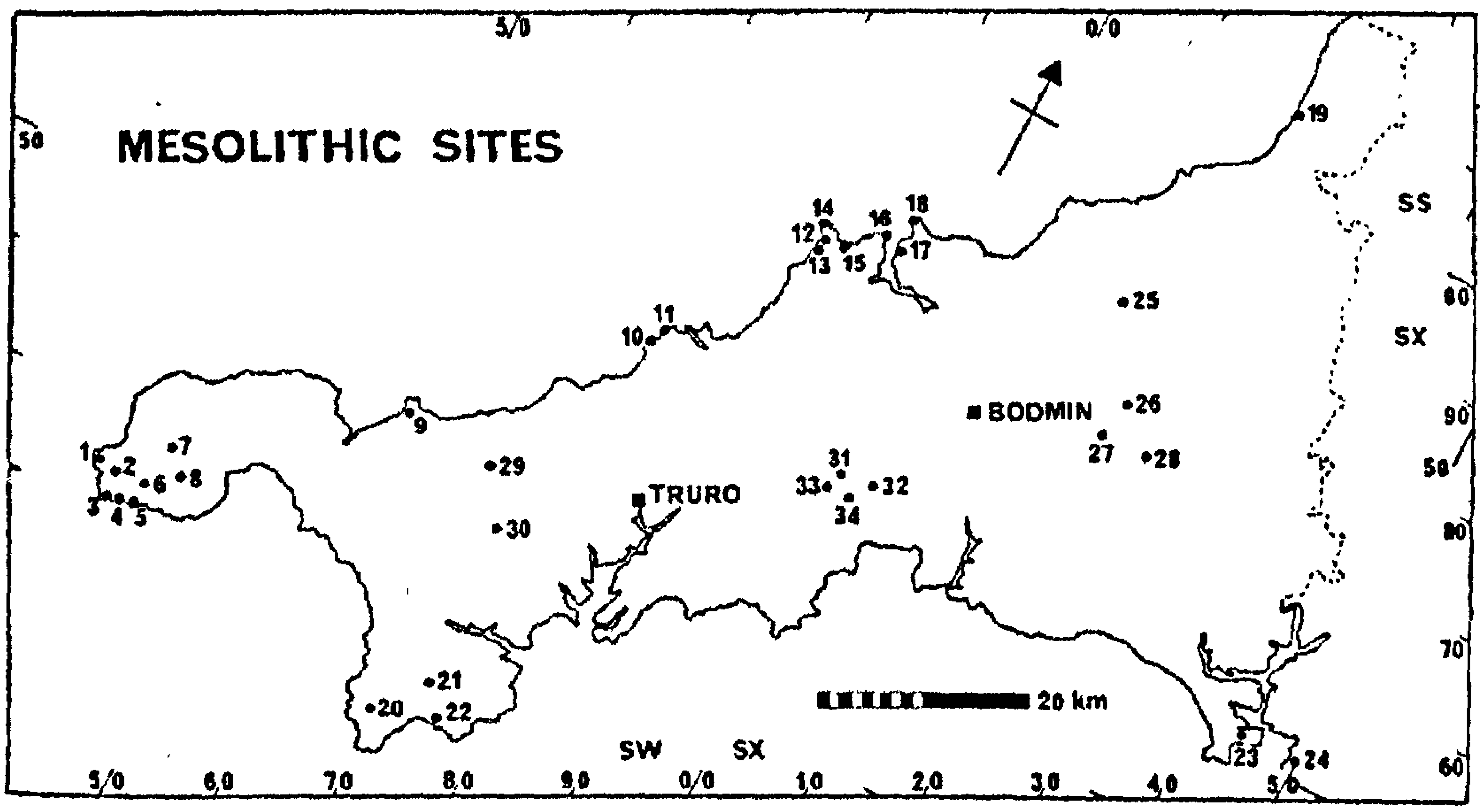
SITE	LAB SAMPLE	BP	CAL.BC
(HM) Hembury, Devon	BM-138	5280 ± 150	4450 -3700
(CB) Carn Brea, Cornwall	BM-825	4999 ± 64	3960 - 3649
(HH) Hazard Hill, Devon	BM-149	4920 ± 150	4036 - 3368
(HW) Hay Wood cave, Som.	OxA-5844	4860 ± 65	3773 - 3520
Post Track			3838 (Dendro)
Sweet Track			3806/7 (Dendro)

Table 10 shows the dates for the early Neolithic in the south west peninsula. There is a large gap in the radiocarbon record that will only be filled with additional data when it becomes available, but until this time it is difficult to make comparisons on the present evidence. As can be seen from Fig.33, both late Mesolithic and early Neolithic sites are spatially dispersed throughout the peninsula, the closest sites geographically are Carn Brea and Poldowrian in Cornwall. However, there is a chronological gap, from the radiocarbon dates available, between Carn Brea (early Neolithic) and Poldowrian (late Mesolithic) of approximately fifteen hundred years. On the other hand, there is a later Neolithic phase at Poldowrian dated to 4338 – 3653 cal.BC (HAR-4323) and 3960 – 3365 cal.BC (HAR-4052) which puts it at around the same time as the Neolithic at Carn Brea and these sites could be contemporary and could have been used by the same Neolithic group.

The other group that might have any geographical association is in Somerset with Birdcombe, the Mendip caves and the Sweet Track. As has been shown in Chapter 6, there is the likelihood of a territorial association between the Birdcombe site and sites on the Mendip Hills. The radiocarbon dates for the three Mendip caves and Birdcombe are separated chronologically by approximately three thousand years, although the flint typology from Totty Pot suggests it is later Mesolithic and that there is a link between Totty Pot and Birdcombe.

The only other available evidence we have for the later Mesolithic period in the south west peninsula is from flint tools. For the Mesolithic period, the few finds that exist for Devon are from surface scatters which are usually mixed with later material (Miles

1975-6); for Cornwall there is more identifiable Mesolithic material, with some sites having been excavated with radiocarbon dates; Somerset has the most complete assemblages from both surface collections and excavation.



1. Greeb; 2. Stamps; 3. Roskestal; 4. Pedn-men-an-mere; 5. Treen; 6. Crean and Tressider; 7. Carn Euny; 8. New Shop; 9. Gwithian; 10. Penhale Head; 11. Kelsey Head; 12. Booby's Bay; 13. Constantine Bay; 14. Trevose Head; 15. Harlyn Bay; 16. Stepper Point; 17. Daymer Bay; 18. Pentire Point; 19. Crooklets; 20. Windmill Farm; 21. Croft Pascoe; 22. Poldowrian; 23. Maker; 24. Staddon; 25. Crowdy Marsh Reservoir; 26. Dozmary Pool; 27. Colliford Reservoir; 28. Siblyback Reservoir; 29. Carn Brea; 30. Stithians Reservoir; 31. Cocksbarrow; 32. Caerloggas I & III; 33. Watch Hill; 34. Trenance Downs.

Fig. 34 Map showing the location of Mesolithic sites in Cornwall (Berridge and Roberts 1986)

Jacobi's study of hunter-gatherers in the Flandrian period in the south west of England (1979) has shown the fragmentation of the present collections. One of the largest assemblages of flint for Cornwall comes from surface finds such as Baggy Point (Roskestal, Greeb, Stamps) Fig.34, 1-8 in the West Penwith area (Berridge and Roberts 1986); from the Constantine Bay area (Trevose Head) Fig.34, 14 (Berridge and Roberts 1986) and the Lizard (Smith 1987). Although much of the material from Trevose Head comes from different locations in the area, with sometimes vague provenances, over eight thousand pieces of worked flint have been recovered from Site TV1. The flint derives from surface collections and there is evidence that the site was used over a long period of time spanning both the early and later Mesolithic periods (Johnson and David 1982). Jacobi has suggested that this area, which would not have been coastal in the early Mesolithic period, would have acted as a more permanent occupation area, with coastal and inland resources being available and from which hunting groups would move to higher ground in the summer (Jacobi 1979, 76-78).

The area of the Lizard (Poldowrian, Croft Pascoe and Windmill Farm) Fig.34, 20-22 has been the subject of an extensive fieldwalking programme (Smith 1987) where flint from both the later Mesolithic and Neolithic periods has been found, although from surface collection alone it was not possible to distinguish a separation in time between these two periods. Excavation at Poldowrian (Fig.34, 22) recovered hundreds of worked flint from the late Mesolithic and Neolithic periods together with pits and postholes, although it was not possible to stratigraphically separate the Mesolithic and Neolithic phases. Further extensive fieldwalking and excavation has been carried out at Gwithian (Fig.34, 9) where sixteen Mesolithic sites had been found where hunter-gatherer groups were exploiting an estuarine environment.

On Bodmin the well known site of Dozemary Pool has been recognised as an early Mesolithic site (Fig.34, 26) and further evidence of Mesolithic activity has been found elsewhere on Bodmin, at the Coliford Reservoir (Fig.34, 27). Fieldwalking from Butterstor and elsewhere on the moor has produced a general scatter of flint from the later Mesolithic period, but it is believed that these sites do not represent base camps, but semi-permanent sites that were part of the seasonal hunting round (Herring and Lewis 1992). Overall, for Cornwall, there is a concentration on the north coast with predominantly cliff top hunting sites, with Poldowrian and Windmill Farm, on lower ground, being viewed as more long-term base camps, due to the variation in their flint collections (Berridge and Roberts 1986).

For Devon, there is evidence of a Mesolithic presence throughout the county, but it comes from flint scatters and is often mixed with later material (Fig.35). Finds from Westward Ho! Devon, originally numbered nearly two thousand pieces, but only twelve now survive. Of the thirty five microliths from Yelland, Devon, the majority were broken which made classification difficult. There is an absence of Neolithic sites on Dartmoor, but the major early Neolithic sites are found in hill-top positions and there is mixing on some sites, such as Hembury (Miles 1975-76). When Jacobi undertook his study of hunter-gatherers in the south west in the Flandrian period in 1979, he considered that only the sites of Portland I, Dorset, Three Holes Cave, Devon, (Carn) Greeb, Cornwall, Roskestal Cliff, near Baggy Point, Cornwall and

Hawkcombe Head, Somerset, contained sufficient material that was suitable for the study.

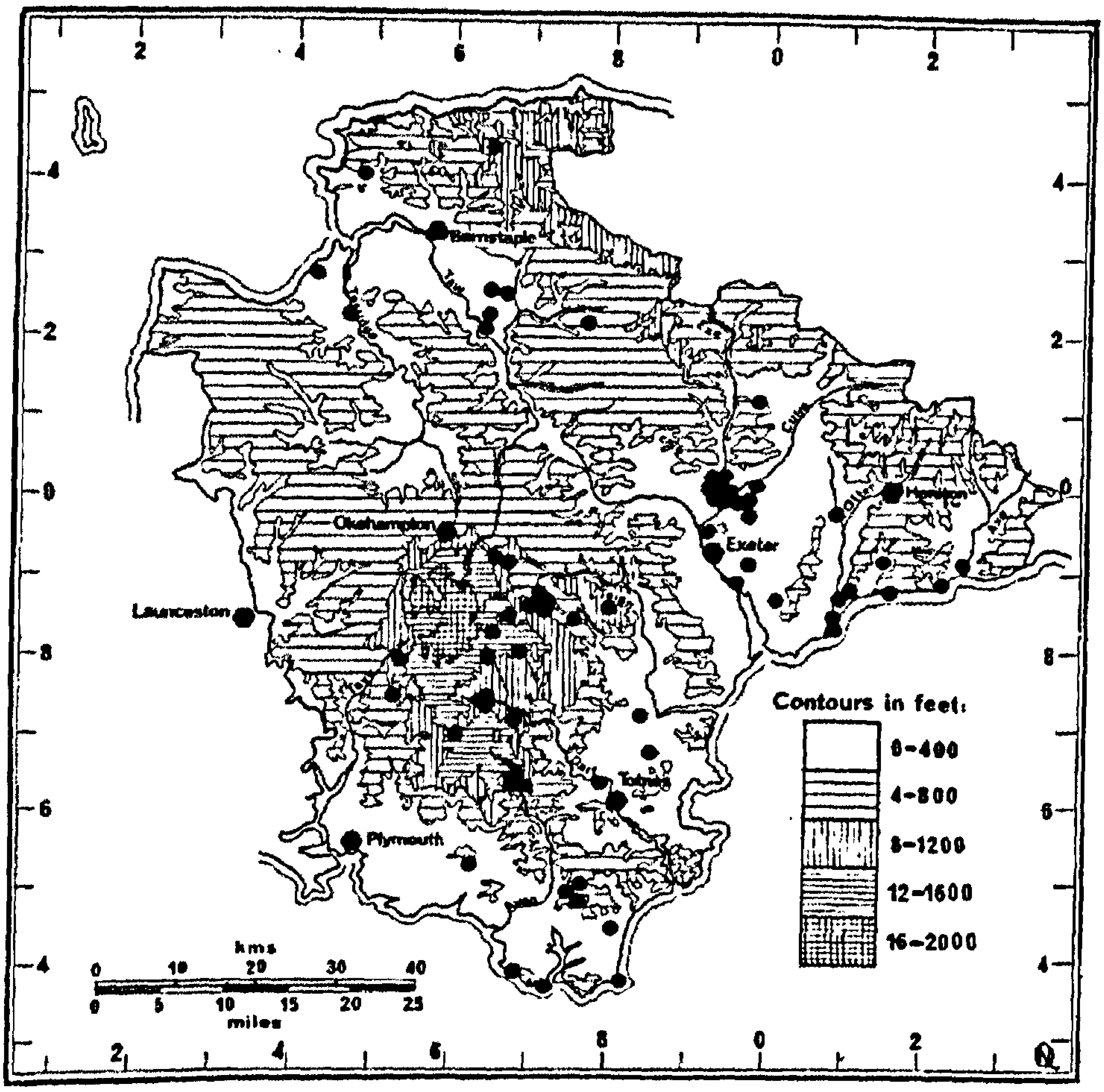


Fig. 35 Distribution of flint scatter sites in Devon (Miles 1975-6)

Jacobi's study showed that within England as a whole, it was possible to identify "discrete and cohesive geographical patterning", with a distinctive, south western social grouping in what Jacobi describes as a "south-western microlithic technology" (Jacobi 1979, 72). Unfortunately, from the flint evidence alone, it was not possible to demonstrate whether the sites, mentioned above, were contemporary.

Jacobi is cautious as to whether this demonstrates a specific tool technology for the 'later hunter period' as a distinct group for the south west, as Horsham points have been found from Shapwick and Edington Burtle (Jacobi 1979, 73) and, more recently, from Birdcombe in the 1997 excavation. Norman's work at Chedzoy has revealed a flint assemblage which is very similar to that from the south east of England (Norman

Fig. 36 Mesolithic finds in the south west peninsula (Jacobi 1979)

1975) suggesting that the south-west peninsula may have not been as isolated as Jacobi's study initially suggests. Jacobi's 1981 paper, however, extends the south western territory to a much broader 'Southern English' grouping which includes the south east of England (Jacobi and Tebbutt 1981).

For Devon and Cornwall there is little absolute dating and sites have been phased chronologically from their tool typology (Jacobi 1979; Jacobi and Tebbutt 1981). Berridge and Roberts (1986) however, do not believe that that Mesolithic assemblages in the south west show a chronological progression, as the radiocarbon dates for Poldowrian, (6450 ± 110 BP) 5618 – 5149 cal.BC (HAR-4568) and Windmill Farm (6160 ± 150 BP) 5470 – 4718 cal.BC (HAR-4626) show Poldowrian to be slightly older, which is the reverse of what the tool typology suggests. Poldowrian and Windmill Farm are excavated sites from lowland situations and they have been interpreted as long-term base camps.

However, there are stratigraphic problems with the radiocarbon dates from Poldowrian. The earliest date is from charred hazelnuts (6450 ±110 BP) 5618 – 5149 cal.BC (HAR-4568) which falls into the Mesolithic period. There are two further dates (4870 ±130 BP) 3960 – 3365 cal.BC (HAR-4052) from Pit 128 containing leaf shaped arrowheads and pottery and Pit 106 (5180 ±150 BP) 4338 – 3653 cal.BC (HAR-4323). The excavators admit to considerable mixing throughout the site with microliths being found above and below the Neolithic levels, together with mixing in the pits that have been interpreted as Neolithic. The date for Pit 106 suggests Mesolithic contamination and the date from Pit 128 is from the Neolithic period. However, both pits are separated chronologically from the charred hazelnuts by as much as an average of 1300 years for Pit 106 and 1700 years for Pit 128. Although the radiocarbon dating can identify that there were different phases on the site, it does not always solve the stratigraphic problems. All that can be said is that the site was in use over a considerable period of time, but the radiocarbon dates indicate a chronological gap between the Mesolithic and Neolithic activities.

There are few organic or structural remains for Cornwall and from the flint scatters alone, it is not always possible to determine a site's function. Westward Ho! Devon, has been studied intensively, but the radiocarbon dates (6585 ± 130 BP) 5726 – 5303 cal.BC (Q-672) are probably too early to be associated with the Mesolithic-Neolithic transition process. The well documented site of Dozemary Pool, Bodmin, has loosely provenanced collections which are mixed with later material. Although there appears to be extensive microlithic production throughout Cornwall, certain areas appear to have been favoured: the cliff tops of the north coast, together with the lowland sites of Poldowrian and Trevose Head; the granite uplands of Dartmoor and Bodmin; the estuarine area around St. Ives Bay of the Gwithian sites. Jacobi suggests that it was the same hunter-gatherer groups using these sites, rather than separate social groups (Jacobi 1979). There is variability in the data collection, with a distribution of Mesolithic sites on the north coast of Cornwall, with few sites having been found on the south coast between the Helford River and the Tamar. This may be due in part to erosion exposing flint scatters, that are apparent on the north coast and not so in the south (Berridge and Roberts 1986).

These areas used by hunter-gatherers contrast with the Neolithic finds of polished stone, which come from the whole landscape around the granite uplands (Jacobi 1979, 76). Topographically, there do not appear to be any similarities in location, between late hunter-gatherer sites and those of the Neolithic, although Carn Brea has evidence of microliths and microburins. Of the nine microliths, only four are classifiable and none of the Mesolithic tools come from stratified deposits. The presence of microburins suggests tool manufacture at this site and even occupation (Mercer 1981). However, it is more likely that it was coincidental for Neolithic people to be using the same area as that previously by Mesolithic hunter-gatherers.

The paucity of evidence for the Mesolithic period throughout Britain is in part due to the loss of sites through the rise in sea level from around 8700 BP at the end of the early Mesolithic period. In the early Mesolithic period the Maglemosian culture existed in Britain and Denmark until the inundation of the North Sea Basin, after which time tools in Britain evolved without Continental influence (Jacobi 1976). The archaeological and palaeoenvironmental evidence that is available to us from this period can be found along much of Britain's coastline, in the intertidal zone. Evidence of human activity can be seen in the intertidal zone of many coasts and estuaries in south west England. The shell midden at Westward Ho!, Devon, which is exposed at low tide (Balaam *et al.* 1987); the footprints of adults and children and the animal hoofprints at Uskmouth, Gwent (Aldhouse-Green *et al.* 1992), the microliths from Blackstone Rocks, Clevedon (Sykes 1938) and the flint from submerged forests such as Porlock Weir (Wymer 1977) show that this area of the landscape was extensively used, prior to and during the post glacial sea level rise.

Discussion

In Britain at the end of the Mesolithic, we have no evidence of a farming frontier, or the kind of transition sites that might show contact and exchange between foragers and farmers. Data for the later Mesolithic is derived mainly from economic evidence, whereas early Neolithic sites are principally ceremonial monuments. This is drawing evidence from different registers which might be incompatible, but it does allow for the continuing mobility of either foragers or farmers. Many of our late Mesolithic sites have distinct cut-off points, with no later phases, as at Birdcombe and the long barrow sites that have evidence of earlier Mesolithic activity, are often chronologically separated from the Neolithic phase (Saville 1990). Does the deposition of wild animal bone within causewayed enclosures indicate hunter-gatherers retaining their old associations, but being 'caught in the act' of becoming something else, rather than incomers bringing in a new economy? Although we can sometimes see later Mesolithic and what think is early Neolithic activity, the difficulty we sometimes have in Britain is in distinguishing between which cultural group has left the evidence of its activities. This can be seen from the ambiguous evidence that comes from the Post Track and the Sweet Track in Somerset, where the trackway builders would have been managing and organising the landscape for some time prior to the trackways' construction.

Many of our early Neolithic sites, which appear to have Mesolithic antecedents, do not have secure enough associations to suggest overlap, or indeed, any relevance at all to their later occupations. The long barrow sites and causewayed enclosures that have evidence of earlier activity have no temporal connection at all with each other and it appears that the use of the same area of landscape in later periods is purely coincidental. For the later Mesolithic throughout the south western peninsula there appears to be a general pattern of sites on lower ground being occupied as longer stay, or semi-permanent camps, with the use of upland areas as summer hunting grounds. This is apparent for Somerset and the Mendip Hills. For Devon and Cornwall, the pattern is similar, with sites like Trevose Head and Poldowrian.

Spatially, for both the later Mesolithic and the early Neolithic in the south west, sites are geographically separated from each other, as well as having no connection on a temporal basis, except for Poldowrian which has a later phase of Neolithic activity. We can plot distribution maps of Mesolithic and Neolithic sites, but this will tell us little more than where they are located. We just do not have the transition sites in this country to be able to test the 'availability' model successfully.

The archaeological evidence from the south western peninsula, albeit, incomplete, suggests that the Mesolithic came to an abrupt end. At Birdcombe, hunter-gatherers are in still existence around the time of the Whitwell long cairn and the Hembury causewayed enclosure. At Poldowrian, there is a later phase of Neolithic activity, but it occurs several hundred years after the last Mesolithic phase. We have a very different transition process to that which occurred in Europe. If the indigenous population had any involvement in monument building we cannot see this in the archaeological record, although the radiocarbon dates suggest that both hunter-gatherers and monument builders were using the landscape at the same time, but not always in the same area.

The traditional view of the early Neolithic being associated with sedentism, pottery and polished stone from the initial construction of the monuments no longer holds good. The conclusions reached by Moffett *et al.* (1989, 254) after investigating twenty six Neolithic sites in Britain, was that in comparison with the permanent land clearance for arable agriculture in the late 5th millennium bc on *LBK* sites in Europe, the use of the British landscape for farming was under-exploited. They point out that it was not until the late Bronze Age that the full agricultural potential was reached in Britain. They also suggest that pastoralism was more likely to have been adopted by hunter-gatherers, with the herding of domesticated animals into partly cleared woodland, rather than these areas being opened up for permanent cereal production (Moffett *et al.* 1989, 255).

However, the large amounts of charred grain that has been recovered from the Balbridie timber hall and from the Neolithic settlement of the Scord of Brouster suggests that in some areas, cereal cultivation may have been grown on quite a large scale, but at present we only have evidence from marginal areas, but this might be due to taphonomic reasons. The field systems at Céide Fields in Ireland also suggest more permanent settlement, although these fields could have been used for pasture as much as for arable cultivation.

The picture that emerges for the south west peninsula at the end of the 6th millennium BP is that Mesolithic hunter-gatherers were mobile and any early Neolithic activity should be seen in the same way. There is no evidence for permanent settlement and although we have what appears to be very early Neolithic monuments in the Post Track and the Sweet Track, there are no permanent occupation sites that are associated with it. The causewayed enclosures have no evidence of permanent occupation and appear to be used only as seasonal meeting places. Although there is evidence for the use of cereals from the causewayed enclosures we have little evidence for the early Neolithic in England as to the scale of its cultivation. Permanent field systems like those in Co. Mayo, are not found in England until the early Bronze Age and the overall picture, therefore, appears to be one of mobility, practised by both the later Mesolithic and early Neolithic communities.

CHAPTER 8

CONCLUSIONS

Introduction

Previous research in the Mesolithic period of south west England has often focused upon flint collections as it is the stone tools that are likely to survive in the archaeological record. The retrieval of primary data was seen as crucial to expanding the British database for the later Mesolithic period and for putting Mesolithic sites in the south west into a wider, landscape context. In the past we have relied upon European models to understand the transition, but the evidence from late Mesolithic and early Neolithic sites in Britain is varied and different to that in Europe. The recovery of new data through fieldwork and excavation in Somerset, together with new radiocarbon dates has broadened the database for the late Mesolithic in Britain. A model of hunter-gatherer occupation of the lowland area of the Birdcombe valley, together with upland seasonal hunting and burial on the Mendip plateaux has been put forward for the late Mesolithic in North Somerset.

The climatic and environmental conditions from the beginning of the Holocene to the Neolithic period are essential to understanding hunter-gatherer patterns of settlement and movement through a changing landscape, where there has been either a diminution of resources, or the creation of new ecosystems. The inundation of the North Sea Basin and the loss of essential hunting grounds would have had a profound effect upon hunter-gatherer movement. Adaptation was essential for hunter-gatherers to sustain their lifestyle throughout the Mesolithic period.

The current debates for the transition in Europe have polarised into discussion between *diffusionists* and the 'wave of advance' model and *indigenists,* who propose that hunter-gatherers had a role to play in the adoption of farming. The 'neolithisation' process in Europe is examined, together with the evidence for a 'farming frontier'. In Britain the Neolithic is seen as both an economic and a social change, with monument construction first emerging in the 6th millennium BP. The increasing body of archaeological evidence from Europe suggests that the changeover to farming was not uniform, but had regional variation. The evidence from Britain suggests that a farming frontier did not exist and that the adoption of farming occurred in a different way to that in Europe. This research has shown that it is not possible to apply Rowley-Conwy and Zvelebil's 'availability' model to the British data without considerable modification.

The palaeoenvironmental evidence for that might constitute some kind of social complexity in hunter-gatherers in Britain has been assessed. There is an increasing body of evidence from palaeoenvironmental studies that suggests that hunter-gatherers were manipulating their environment in some way, either through the use of fire with controlled burning or from the evidence of pre-elm decline cereal pollen that might suggest Mesolithic cultivation. Although it is highly possible that hunter-gatherers were interfering with their environment in a deliberate way, the archaeological evidence to confirm this is often inconclusive. It is not possible to detect in the pollen record at present whether repeated firing of the landscape occurred for athropogenic or natural reasons and many of the identifications of pre-elm decline cereal pollen can be ambiguous.

The Mesolithic flint collections held in the North Somerset museums have been examined and assessed. Using this evidence a distribution map (Fig. 28) of the Failand Ridge and Mendip suggests that there was a concentration of Mesolithic activity along the north west coast of North Somerset and extensive use of the Mendip Hills. The lack of sites on the lower ground of the North Somerset moors is probably due to the deep deposits of alluvium and colluvium that have been laid down since the Mesolithic period, which makes the recovery of the evidence difficult and often opportunistic.

The two sites at Birdcombe and Totty Pot were chosen for excavation because although they have different topographical locations, there is a similarity in tool typology. Mesolithic hunter-gatherers made frequent visits to Birdcombe over a considerable period of time and had links with sites on Mendip and the south east of England. The evidence for Mesolithic activity on Mendip suggests temporary hunting activity, probably on a seasonal basis, rather than more permanent occupation. The radiocarbon dates from Birdcombe suggest a lingering presence by hunter-gatherers well into the Neolithic period, with Birdcombe the latest Mesolithic site in Britain.

The evidence for the late Mesolithic in the south west of England and in Britain is assessed. The early Neolithic is seen principally in monument construction, with little evidence of a fully-fledged farming system. However, the evidence of cereal cultivation and more permanent settlement in Scotland and Ireland is also examined. The use of radiocarbon dating to suggest an overlap between the late Mesolithic and early Neolithic is discussed with particular reference to Birdcombe and the south west of England. The radiocarbon dates indicate that there is overlap between hunter-gatherer sites and Neolithic monuments, although the archaeological evidence shows that the Mesolithic and the Neolithic remain distinct cultural groups.

Discussion

The instability of the climate throughout the Mesolithic period meant that hunter-gatherers were constantly adapting their settlement patterns and economic strategies as the environment underwent change over a period of around five millennia. The rise in sea level caused the loss of land, but it also created new coastal and estuarine environments when Britain became isolated from the Continent. This does not mean, however, that the Mesolithic in Britain became dominated by coastal settlement as in Ireland. With the inundation of the North Sea Basin, tool technology developed quite separately from that in Europe (Jacobi 1976). This isolation may have had an effect on the transition to farming, both in the time it took to be adopted in Britain and the way in which occurred. Britain has a diverse topography and the Neolithic cannot be seen as spreading in the manner of the *LBK* across England. When the Neolithic appears in Britain, it is fragmented and varied, with the first monuments spreading almost haphazardly across the country, with only marginal areas in Scotland (Scord of Brouster, Whittle *et al.* 1986) and Ireland (Céide Fields, Caulfield *et al.* 1998) having evidence of more permanent agriculture.

Current debates

The debates that surround the transition derive from the 'wave of advance' model and its' criticism by the *indigenist* camp. The spread of farming may have begun in a uniform manner and spread like "ripples on a pool" from the Near East (Ammerman and Cavalli-Sforza 1971; 1984), but by the time it reached Western Europe it was fragmented and varied. The 'wave of advance' has been seen purely in terms of economy and takes no account of the social changes that were occurring at the same time. Ammerman and Cavalli-Sforza have been criticised for using radiocarbon dates where pottery alone was taken as a sufficient indicator of farming (Zvelebil 1986). The 'wave of advance' takes no account of areas such as Scandinavia and the Balkans where farmers and foragers were living side-by-side and retaining their cultural identity. Zvelebil (1995a) suggests that it may have been displacement by farmers in some areas and adaptation by the indigenous population in others.

Some researchers argue for a 'farming frontier' through which ideas and contacts could filter (Dennell 191985; Rowley-Conwy 1986; Zvelebil 1995a). In Britain there is no evidence of a farming frontier, although Woodman suggests that farming may have arrived in Ireland through contact with Britain (1999, 50). Ferriter's Cove, Co. Kerry, has the earliest evidence for domesticated cattle bone (5825 ± 50 BP; OxA-8775), but it is found on a Mesolithic site. The cattle bone could have arrived in Ireland through contact with England or the Continent, but evidence of a 'farming frontier' between England and Ireland is not seen in the archaeological record.

In Britain there does not appear to have been a contact zone with Europe prior to monument construction. The 'farming frontier' that existed in Europe suggests an economic symbiosis between different cultural groups, but in Britain we have a juxtaposition of economic sites and ceremonial sites. The Neolithic sites that have earlier Mesolithic artefacts, at Hazleton North (Saville 1990) and Hembury (Liddell 1935) do not have a clear stratigraphic association. However, the continued use of particular places by hunter-gatherers which could have involved clearance, may have also been attractive to Neolithic groups when building monuments.

It is possible to make distinctions between cultural groups such as the Bug-Dniester and the Cris-Köros in the Balkans (Zvelebil 1995a) and the Ertebølle and the cultivating groups to the south and east which include the Michelsberg and the *TRB* (Rowley-Conwy 1986), but in Ireland this is not so clear. Although Zvelebil (1995a) wants a definition that will enable farmers and foragers to be clearly distinguished in the archaeological record, the appearance of domesticated animal bone and cereals in the deposits of the causewayed enclosures in Britain, does not necessarily suggest an economic interpretation. These early agricultural indicators might have been used for prestige rather than as an essential part of the economy (Whittle 1996).

The lack of 'transition' sites in Britain makes it difficult to test the 'availability' model. Both the 'wave of advance' and the 'availability' models focus on a change in economy and the 'availability' model has been criticised on the grounds that it is biased in favour of hunter-gatherers (Thomas 1988), although social changes at the same time are implied by Zvelebil and Rowley-Conwy (Zvelebil 1995a). Both

Thomas (1997; 1999) and Whittle (1996) agree that it is probably impossible to see the changeover in action in this country, but that once change came, it was abrupt.

There is no archaeological evidence in this country to suggest the demise of hunter-gatherers. *Demic-diffusion* may be an unfashionable model in view of recent archaeological work, but in this country we have a separation of culturally different sites, with no overlapping evidence that can be attributed to a contemporaneous exchange of artefacts. In other words, we do not have hunter-gatherer sites with Neolithic material culture, neither do we have Neolithic sites that contain microlithic horizons, although the radiocarbon dates suggest that late Mesolithic and early Neolithic sites may have overlapped chronologically. This pattern of complete cultural separation does not necessarily suggest that it was *demic-diffusion* that brought farming, as we cannot plot a 'wave of advance' across Britain, but neither does it fall entirely into the *indigenist* model.

Social complexity

Social complexity has been put forward as a reason for hunter-gatherer groups to have had a role to play in the adoption of farming. The supporters of *indigenism* have used the palaeoenvironmental evidence to support the idea of social complexity in hunter-gatherer groups. The repeated use of fire to attract game and increase the growth of hazel (Mellars 1976; Simmons 1993, 1996; Simmons and Innes 1987, 1996a; Caseldine and Hatton 1993); the collection of fodder (Dimbleby and Simmons 1974; Charles *et al.* 1998) and the identification of cereal grains in pre-elm decline contexts have been put forward as evidence that hunter-gatherers were capable of manipulating their environment and could, therefore, be regarded as socially complex.

Simmons' work on the North York Moors (Simmons 1993, 1996; Simmons and Innes 1987, 1996a) and Caseldine and Hatton's study of Dartmoor (1993) shows that repeated firing of the landscape can be identified in the pollen record. Ethnographic evidence from North America shows that the firing of vast areas of the prairies was part of a well organised landscape management scheme (Lewis 1982), but we do not know whether similar strategies were being carried out in prehistoric Britain. The phases of repeated burning that are seen in the pollen record strongly suggests that humans were interfering with the environment, but there needs to be a closer association with the archaeological evidence before we can say it was a deliberate and controlled activity by hunter-gatherers.

The question arises as to why there was a need for manipulation of the environment by hunter-gatherers (Simmons 1979), if the carrying capacity of the Atlantic forest was sufficient to provide enough resources. Ethnographic studies show that a balance between a growing population and the available resources was essential (Cohen 1977). If hunter-gatherers could not maintain this balance this might be one of the reasons for deliberate interference to increase production and ultimately the adoption of a new economy.

Edwards (Edwards 1989a, 1989b; Edwards and Hirons 1984) has identified an increasingly number of sites in Britain with pre-elm decline cereal pollen grains, but more secure archaeological evidence needs to be associated with it before we can unequivocally say that cereals were being grown in the Mesolithic period. Often there are only one or two grains found on each site and identification is not always secure. The collection of fodder is well documented in post-Medieval North Atlantic contexts (Charles *et al.* 1998), but the pollen record in Britain may not provide the most convincing evidence to suggest that it was collected in the prehistoric period (Simmons 1996).

Some sort of social hierarchy might also be inferred by burial with grave goods and the Mendip cave sites have Mesolithic burial with associated artefacts. The bâton de commandement was found close to the burial of 'Cheddar Man' (Davies 1904) and winkle shells are associated with the burials from Aveline's Hole (Davies 1920-25). This could suggest complexity and some sort of hierarchy amongst hunter-gatherer groups with some burials being important enough to have artefacts deposited with them.

The above evidence is tantalising, but not entirely conclusive. Whittle suggests that the Mesolithic had the means and the equipment to be able to manipulate their environment (Whittle 1996). It is highly likely that the indigenous population were "not waiting for the Neolithic to arrive" as suggested by Rowley-Conwy (1997), but the archaeological evidence in Britain, has so far not produced unequivocal data to support it. The argument, therefore, cannot be totally carried by the *indigenists.*

South West England

European analogies have not been successful in generating satisfactory models for the transition to farming in Britain. The evidence recovered from the excavation of two Mesolithic sites in Somerset, together with two radiocarbon dates for Birdcombe has, however, expanded the British database and broadened our knowledge of the activities of late Mesolithic hunter-gatherers in Somerset.

The flint typology, together with the radiocarbon dates from Birdcombe confirm that the site was used throughout the Mesolithic period, although the microliths are predominantly from the later Mesolithic period. The hunter-gatherers at Birdcombe had links outside their territory as the fragment of the Horsham point indicates a connection with south east England. They were also prepared to travel some distance to obtain high quality raw material, or they had links with hunter-gatherers from Wiltshire.

Birdcombe and Totty Pot are topographically different sites, but their microliths are similar to that from other sites on Mendip such as Gorsey Bigbury (ApSimon 1949-50 and Hay Wood Cave (Everton and Everton 1972). Birdcombe shows considerably more phases of activity than have been found on other Mesolithic sites on Mendip and the data from the 1955 and the 1997 excavations can be used to create a model for hunter-gatherer movement in North Somerset. The flint recovered from fieldwalking in the valley slopes of the Failand Ridge, indicates that hunter-gatherers were using this area extensively in the prehistoric period. They were probably following the river and the spring line between Clevedon and Tickenham in the west and Gatcombe in the east, before moving up to the higher ground of Mendip for summer hunting. The area north of the Failand Ridge and the Avon Gorge was also extensively used in the Mesolithic period, but many of the flint finds are loosely provenanced and there has been no excavation in the area (Fig.28).

Aveline's Hole, Totty Pot and Gorsey Bigbury are within the central Mendip area and are about 3km from each other. Hay Wood Cave is 13 km west of this area and on the north facing escarpment of Hutton Hill. Hunter-gatherers were using both the north facing and the south facing scarp of the western edge of Mendip before the limestone ridge meets the coast at Brean Down. The Mesolithic communities who were using Birdcombe had access to game and other resources on the higher ground north of the site on the Failand Ridge as well the Mendip Hills to the south (Fig.28).

The similarities in the flint collections between Birdcombe, Totty Pot, Gorsey Bigbury and Hay Wood Cave, suggest that it was the same hunter-gatherer group which was using an area the size of approximately 550 km^2 as part of their seasonal round.

There is no known evidence to suggest permanent occupation on Mendip by hunter-gatherers in the Mesolithic period and it is more likely they were using the uplands for hunting and burying their dead, but retreating to more sheltered sites, such as Birdcombe, where resources would have been available during the winter months.

In a wider south western context, Jacobi has suggested that Poldowrian and Trevose Head in Cornwall, which are lowland sites, probably represent more long-term base camps with hunting on higher ground (Jacobi 1979). Birdcombe and the uplands of Mendip could also be seen in a similar context.

The lack of early Neolithic flint tools at Birdcombe has relevance for the radiocarbon dates: the younger date of 4700 ± 50 BP (3637 – 3362 cal.BC) (Beta-147105) is associated with three scalene triangles from the same context. There is no early Neolithic flint on site or mixing of stratigraphic deposits within the grid square. This date indicates a very late presence for Mesolithic hunter-gatherers which is later than the monument building at Hembury, Hazleton North, Carn Brea or Hambledon Hill (see Table 6). Other Mesolithic sites which have radiocarbon dates into the Neolithic period, such as Poldowrian (4870 ± 130 BP (3960 – 3365 cal.BC) (HAR-4052) and Eskmeals 4925 ± 165 BP (4042 – 3362 cal.BC) (UB-2711) come from contexts that were contaminated with Neolithic charcoal (Poldowrian) (Smith and Harris 1982) or from later Neolithic activity on site (Eskmeals) (Bonsall *et al.* 1989). At Birdcombe, there are no Neolithic phases of activity.

The evidence recovered from Birdcombe shows a very clear cut-off point at the end of the Mesolithic period. Birdcombe and other late Mesolithic sites in the south west and in Britain generally, appear to have been abandoned abruptly, as though hunter-gatherers gave up their lifestyle suddenly and completely. There is no archaeological evidence to suggest the reasons for the abandonment of a site that had sufficient resources and shelter to allow hunter-gatherers to stay for a considerable period of time. One valid explanation is the environmental pressure that has been seen in the tree-ring chronologies of the Belfast and German laboratories around the time of the transition (Baillie 1995). Any slight change in the ecosystem of the Birdcombe valley might have been sufficient to upset the subsistence base and cause hunter-gatherers to adopt a different economy elsewhere. The Kenn Moor and Gordano Valley studies, show changes in the local environment at the end of the Mesolithic period (Jefferies et al. 1968; Butler 1987; Gilbertson et al. 1990) when the plant evidence suggests an initial decrease in freshwater aquatics, but a later rise in water table with wetland taxa such as *Typha* by the transition period. If the people at Birdcombe found a diminution of resources because of changes in climate or the local environment, they may have had to compete for territory with farming groups. The abrupt abandonment, of what had been a frequently visited site throughout the Mesolithic, may be as a result of environmental, rather than social factors.

The latest radiocarbon date from Birdcombe (4700 ± 50 BP (3637 – 3362 cal.BC) (Beta-147105) suggests that hunter-gatherers continued their lifestyle well into the Neolithic period. Hunter-gatherers must have been aware of the existence of a different culture, but they chose not to take it up. If mobility persisted into the Neolithic, this may have precluded contact and exchange between hunter-gatherers and farmers. The calendar date for the Post Track, Somerset (3838 BC) and the material culture found beside the Sweet Track suggests it was built by Neolithic people, but the fact that previous woodland management, either by hunter-gatherers or early farmers, might have occurred prior to its construction must be taken into account. The late radiocarbon date for Birdcombe suggests that it is possible that it was hunter-gatherers who could have been managing and coppicing the woodland prior to the trackway's construction. It is difficult to identify which cultural group may have been responsible for constructing the trackways if the radiocarbon dates are taken into consideration.

There are few radiocarbon dates that are available for the south west of England, but those that we do have indicate that two distinct cultures were in existence at the same time. However, the archaeological evidence does not suggest that there was any contact between them. Cultural separation is seen on sites such as Poldowrian, Cornwall and Hay Wood Cave, Somerset. The microliths from Hay Wood cave show a late Mesolithic presence (Everton and Everton 1972), but the radiocarbon date and the stable isotope analysis from the human bone indicates not only that the burial was Neolithic, but that with the Neolithic came a complete change of diet (Richards and Hedges 1999). The stable isotope analyses carried out by Richards and Hedges suggests that in coastal areas of southern Britain there was a rapid change in diet with the Neolithic, that is associated with domesticated plants and animals (Richards and Hedges 1999, 893). Although there may be a continuation of focus on some sites, such as Hay Wood Cave, the economy and diet remains culturally distinct from the preceding Mesolithic.

Once farming arrives in Britain, the need for a microlithic technology no longer exists. If hunting ceases to be part of the primary subsistence base, then this may explain the changes in tool typology, but hunting remains important in the Neolithic period. The Neolithic was different from the Mesolithic both in diet, material culture and social organisation, but in south west England we cannot see in the archaeological record the mechanisms by which two very distinct cultures might have merged, or where a farming economy took over from hunting and gathering. Later Mesolithic and early Neolithic sites in south west England are overall geographically separated (Fig. 33).

There are early Neolithic long barrows on Mendip including those at Pen Hill and Stoney Littleton, but there are no radiocarbon dates available for comparison with Birdcombe. The nearest dated causewayed enclosures to Birdcombe are at Hembury in Devon and Hambledon Hill in Dorset. Hunter-gatherers in the south west remain a distinct cultural group, although they must have been aware of changes in the landscape when the first monuments appeared. This is a completely different situation to that in Europe, where the Balkan and Scandinavian evidence shows contact and exchange of material culture between foragers and farmers.

The research that was undertaken for this thesis has enabled me to propose that there are four stages to the transition to farming in south west England:

a) Mobile hunter-gatherers

Late Mesolithic hunter-gatherers are mobile and use a microlith technology. They have contacts with other hunter-gatherer groups some distance away (e.g. Horsham, south east England) and have the capability of travelling long distances to obtain raw material. Territories may include longer stay sites, such as Birdcombe and Poldowrian, together with upland areas that are used for the summer hunting of deer and aurochs. Hunter-gatherer sites such as Birdcombe are still in existence after the first Neolithic monuments were constructed.

b) ***Mobile farmers***

Mobile groups with a new material culture and social organisation erect ceremonial monuments from about 4400 cal.BC. Domesticated animals and cereals appear with the new economy. There is limited evidence for fully-fledged agriculture or permanent settlement. Hunting is still important and woodland clearance could be for cattle grazing as much as for arable cultivation.

c) Symbiosis

Hunter-gatherers continue their lifestyle but are aware of the changes in economy and ideology. Sites like Birdcombe continue to around 3362 cal.BC. These groups do not take up new ideas or acquire prestige items, such as cattle or pottery, although they are aware of them. It is these hunter-gatherer groups that are last seen in the archaeological record as a separate cultural group from the monument builders.

c) *Fully-fledged farming*

By 3300 cal.BC hunter-gatherers have disappeared from the archaeological record. Field systems, which may have been used for arable cultivation or as animal enclosures, are not seen as permanent features in the landscape until the Bronze Age from around 2500 cal.BC. There is a gap of about 1500 years between the first monuments and a full farming system.

In the south west of England we are dealing with a different set of evidence to that in Europe. The Mesolithic remains a distinct cultural group from the Neolithic and although hunter-gatherers have a lingering presence into the Neolithic period, they then disappear abruptly from the archaeological record.

A wider context

The Neolithic in Britain is first seen as a social change, although a different economy is also an intrinsic part of that change. The idea of a mixed farming system and permanent settlement being in place at the time of monument building does not equate with the archaeological evidence. The Neolithic may have grown arable crops in permanent fields at the same time as they were building monuments, but we only have limited evidence in the archaeological record to support it. Mobility probably continued in some areas throughout the transition process with monument builders leading a semi-permanent lifestyle. We cannot argue for an invisible, permanent early Neolithic on "absence of evidence" grounds, but if both hunter-gatherers and early farmers continued to be on the move, this will leave little trace in the archaeological record. However, in Scotland and Ireland the evidence from the Scord of Brouster (Whittle *et al.* 1986), the Céide Fields in Co. Mayo (Caulfield *et al.* 1998), the Lismore Fields (Rowley-Conwy 2000; Jones 2000) and the Balbridie timber hall (Fairweather and Ralston 1993) suggests that cereal cultivation may have taken place on a larger scale and on a more permanent basis than suggested by Milles *et al.* (1989).

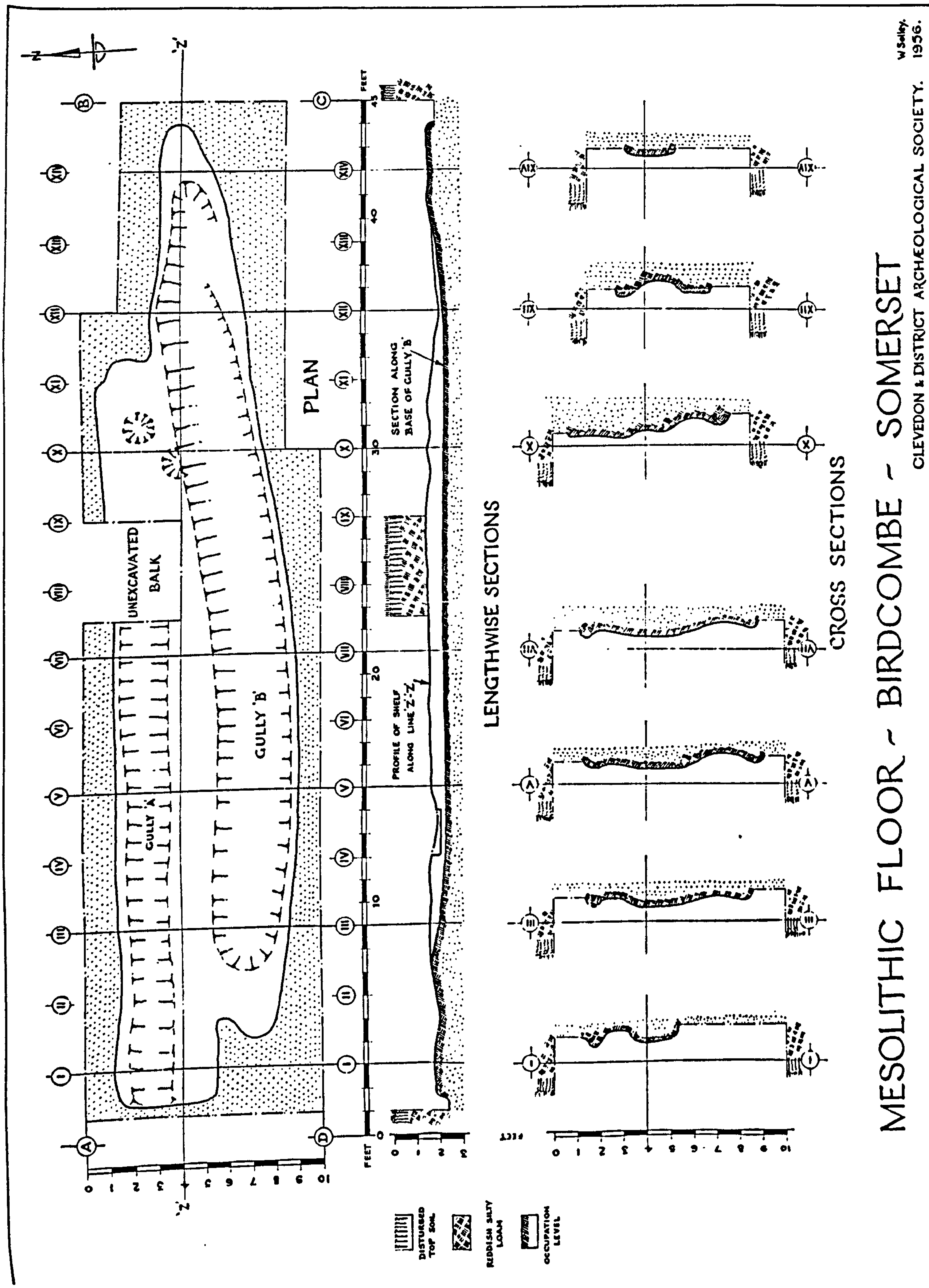
Topographical location for the early Neolithic may have been critical and the territory used by hunter-gatherers may not have been suitable for early farmers. If unstable environmental changes brought foragers and farmers closer together either through loss of land or resources, it was when farming began to expand into hunting territory that choices had to be made. Simmons does not view the transition as a traumatic process, but sees it as the final phase of a continuing adaptation of the environment by hunter-gatherers (Simmons 1996, 223). It may have been this adaptation that enabled the late Mesolithic initially to continue their lifestyle despite the appearance of a new social order, but to take up farming quickly when the decision to do so was finally made. Until further data is recovered it is not possible to be more specific with our interpretations, but the present evidence suggests that both hunter-gatherers and early farmers had a part to play in the transition to farming in Britain.

It is impossible to say on the existing evidence whether it was *demic-diffusion* or *indigenism* that was the mechanism behind the Mesolithic-Neolithic transition in Britain. Zvelebil suggests that "the two views are not necessarily exclusive" (1995a, 107) and with Britain's diverse topography it may have been a combination of the two. The overlap that is shown by the radiocarbon dates suggests that both a hunter-gatherer and farming economy were in existence at the same time. Although the palaeoenvironmental evidence suggests that the Mesolithic may have been socially complex and had a role to play in the changeover to farming, this is by no means conclusive for the evidence in Britain. Therefore, the appearance of a Neolithic economy which is separated culturally from the Mesolithic, suggests that it was brought by incomers, rather than the indigenous population adopting new ideas on a piecemeal basis, as found in the Balkans. The construction of monuments across southern Britain may appear in an almost haphazard manner geographically, but chronologically they cluster around 4400 – 4000 cal.BC (Table 7). The lack of 'transition' sites in Britain suggests that domesticates may have been introduced through acculturation or migration and Ammerman and Cavalli-Sforza (1971; 1984) should not, therefore, be completely pushed aside. However, the difficulty that we sometimes have in identifying cultural groups around the time of the transition, as in the case of the Sweet Track, does suggest a degree of indigenous involvement. The transition may be the final stage in what Simmons describes as 'the evolution of landscape, ecology and land use of the entire Holocene' (1996, 223) and in Britain it has an intricacy of its own that is not mirrored in Europe.

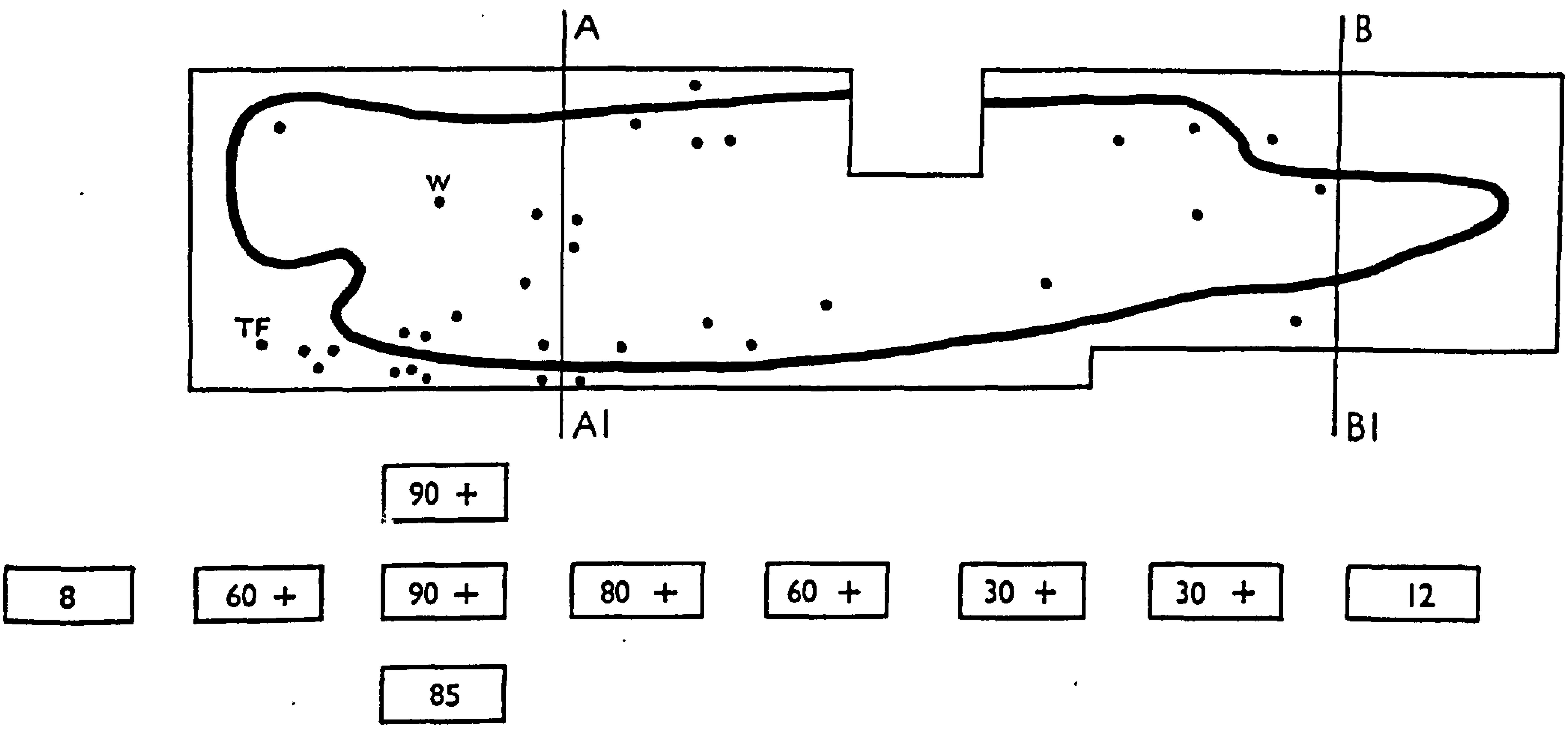
Future work

Although the excavation and fieldwork undertaken as part of this research has been concentrated in Somerset, the evidence recovered has increased the database for the later Mesolithic period in Britain. If we have any transition sites in this country, they are either transformed, eroded, washed-out or re-deposited and we need new research strategies to discover them. Unless sites with 'transitional' assemblages in sealed contexts are found, we may never be able to see the transition process in Britain and flint and faunal collections alone may not be enough to fully understand the transition to farming. More sites need to be discovered and excavated to broaden the database for the late Mesolithic period. More skeletal evidence is needed from both the later Mesolithic and early Neolithic to identify differences in diet and burial practice. The difficulty we have in Britain is in equating the economic evidence found on Mesolithic sites with that from the ceremonial monuments of the early Neolithic and the origins of the Neolithic may not necessarily be found within the monuments (Woodman 2000, 256). We need more secure radiocarbon dates from both periods to strengthen the argument for an overlap between the Mesolithic and the Neolithic periods.and further stable isotope analyses to understand the apparent dietary differences between the two cultures.

APPENDIX



Planning drawing of the 1955 trench (Sykes and Whittle 1960)



PLAN OF MAIN EXCAVATION AND TRIAL TRENCHES
Dots represent implements found *in situ*
T.F. — Trimming Flake from tranchet axe
W. — Wood Tar

Planning drawing of the 1955 trench together with trial trenches (Sykes and Whittle 1960)

Analysis of the Birdcombe woodtar by Elizabeth Aveling (1998)

THE BIRDCOMBE TAR

Initially the Birdcombe tar (BCW) was prepared and derivatized in the same way as all the other archaeological tars, using BSTFA. GC of the sample produced a chromatogram with a couple of clusters of small peaks between 10 and 20 minutes, but dominated by a large 'hump' in the baseline, topped by lots of small peaks. A further sample was made and run in case this was contamination, but the same pattern was seen.

GC/MS of this sample has given some interesting results. The small peaks eluting before the 'hump' have mass spectra that are indicative of diterpenoid compounds. The mass spectra are not particularly good, perhaps because co-elution with other compounds and it is therefore very difficult to identify them. One peak, eluting at 14.282 minutes has been tentatively assigned to methyl dehydroabietate due to the presence of ion peaks at 314 (M) and 299 (M-15). This compound is often abundant in coniferous tars. Retene, another compound usually associated with coniferous tars was not present. The huge unresolved 'hump' of material eluting between about 15 and 30 minutes may consist of polyaromatic material. The chromatograms of the peaks in this region are impossible to characterize as their mass spectra consist of hundreds of consecutive ions. Polyaromatics are difficult to identify anyway as their spectra are very similar to each other.

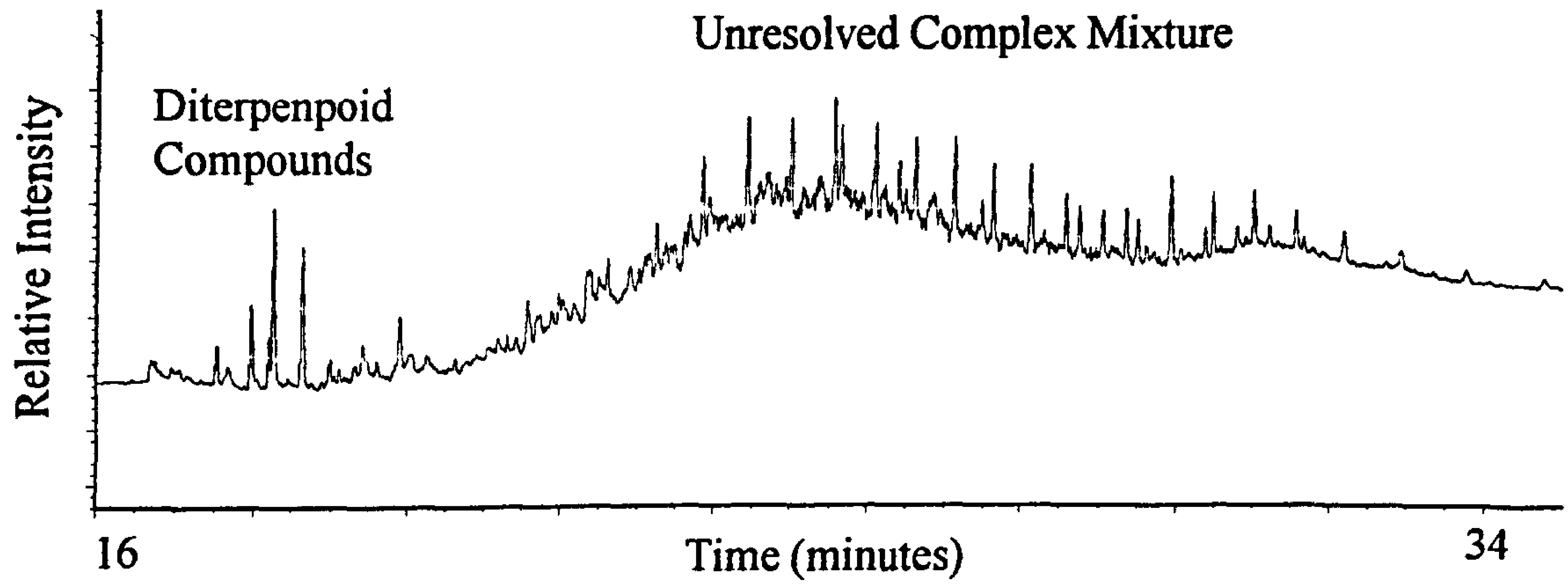
The Birdcombe tar was also prepared using TMTFTH as it was hoped that this might break down the polymeric material. There is still a large 'hump' of unresolved material in the gas chromatogram but the possible diterpene peaks are much more prominent. GC/MS has enabled identification of one of the peaks as methyl abietate, using the on-line mass spectral library and another has been identified as the methyl ester of dehydroabietic acid, using published spectra (Mills and White, 1994). The latter is the most abundant of the diterpene peaks. A third peak has been tentatively identified as methyl 6,8,11,13-abietateraen-18-oate using spectra published by Zinkel *et al.* (1971). Other diterpene peaks are present, but unidentifiable as the mass spectra are poor. There are also a couple of unidentifiable fatty acids.

It seems that the Birdcombe tar is of coniferous origin, although it is impossible to assign it a species. It is certainly very different from the other archaeological tars that have been looked at.

THE BIRDCOMBE TAR
Discussion

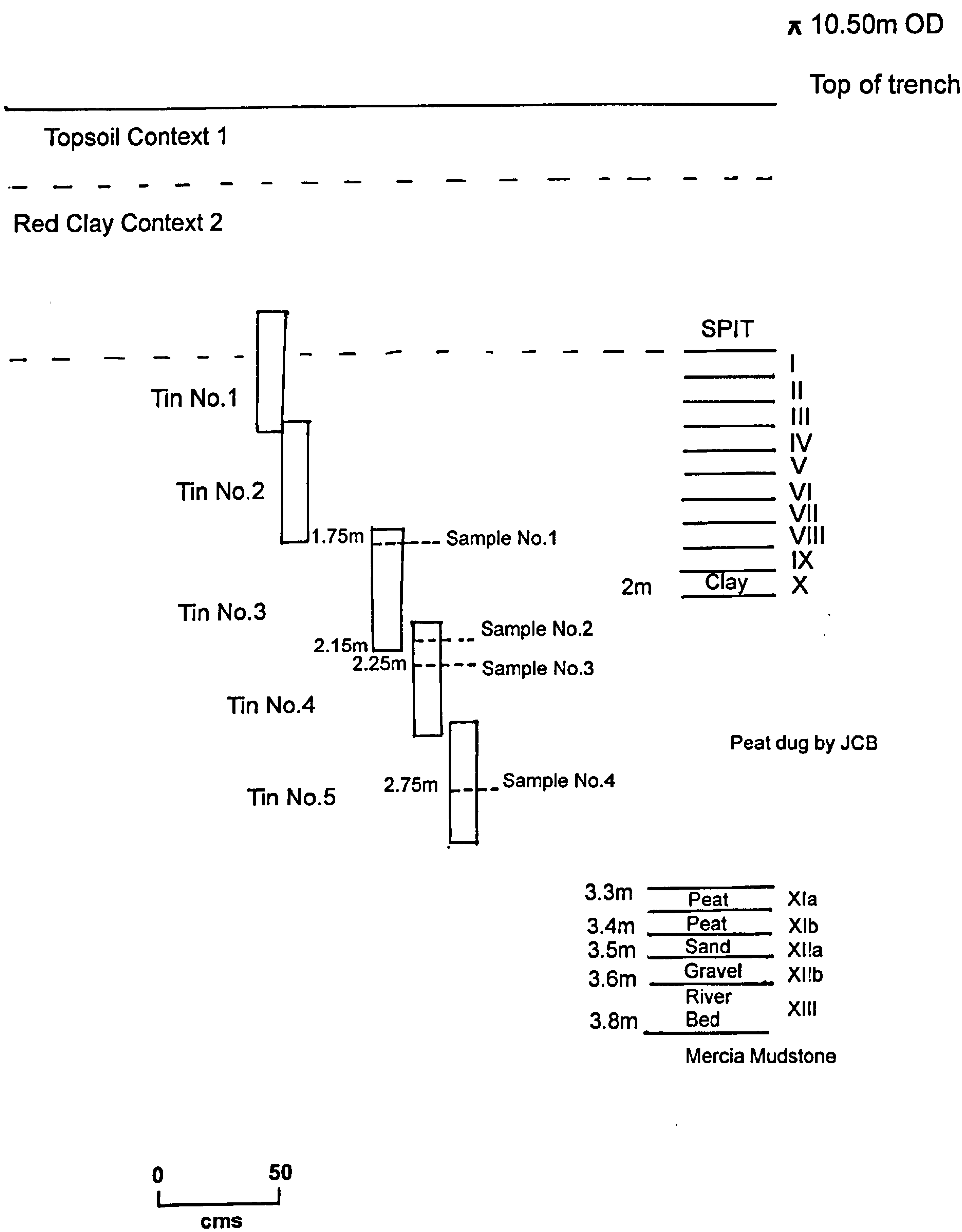
There was a large amount of unresolved material in this sample even following preparation with TMTFTH. Such unresolved complex mixtures have been noted in natural product material by other authors (e.g. Charters *et al.*, 1993). This is perhaps an indication of a highly pyrolysed material produced by an intense heating event. Certainly the birch tars produced by the double pot method where temperatures can reach 500°C were not as well resolved as tars produced by other means at lower temperatures. The 'hump' in the baseline may therefore result from a polymeric material which cannot be fully understood by the methods used here.

The Birdcombe tar was the only find of its kind at the site so perhaps it is not of anthropogenic origin, but a natural phenomenon? Maybe it was an accumulation of resin from a wounded tree which was accidentally pyrolysed during a forest fire? The Birdcombe tar is certainly unlike any of the other Mesolithic tars that were analysed.

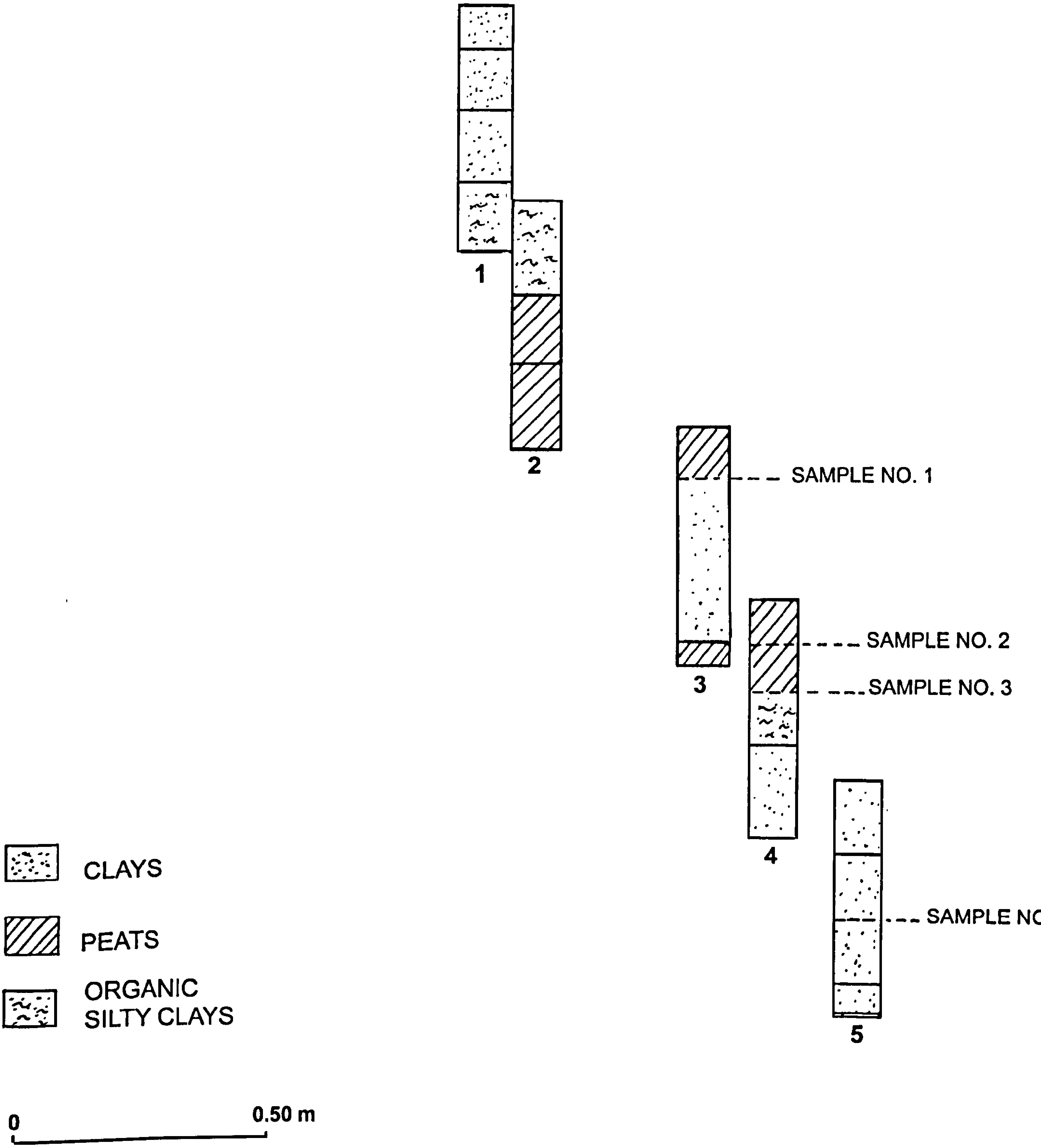


Unresolved Complex Mixture
Diterpenpoid
Compounds
Relative Intensity
16
Time (minutes)
34

Birdcombe, Somerset



Section of trench in the Second River Ground showing position of the column



SECOND RIVER GROUND
BIRDCOMBE
WRAXALL SOMERSET

		FLINT FINDS, BIRDCOMBE 1997							
No.	Illustr. No	Description	Early/Late	Trench	Grid Ref	Context	W/E Metre Sq	Weight g	Material
1	53	Meche de foret	Early	D	W79/N36	3-II	West	1.84	Flint
2	12	Horsham hollowed based point	Early	D Long ext	W77/N38-42	3-II		0.1	Flint
3	3	Obliquely blunted point	Early	D South	W77/N20-29	3-II		0.31	Flint
4	8	Obliquely blunted point	Early	D Long ext	W77/N48-52	3-I		0.47	Carb Limest
5	6	Obliquely blunted point	Early	D Long ext	W77/N38	3-II		0.23	Flint
6	9	Obliquely blunted point	Early	D 2nd ext	W77-79/N34-36	3-II		0.27	Flint
7	1	Obliquely blunted point	Early	D	W79/N35	3-II	East	0.26	Flint
8	10	Obliquely blunted point	Early	D	W78/N36	3-II	West	0.16	Flint
9	5	Obliquely blunted point	Early	D	W78/N35	3-II	West	0.03	Flint
10	2	Obliquely blunted point	Early	D	W78/N35	3-III	West	0.62	Flint
11	4	Obliquely blunted point	Early	D	W77/N37	3-IV	East	0.64	Flint
12		Obliquely blunted point	Early	D	W77/N37	3-IV	East	0.06	Flint
13	11	Obliquely bi-truncated rhombic	Early	D	W77/N37	3-IV	West	0.41	Flint
14		Microburin		D 2nd ext	W77-79/N34-37	3-I		0.62	Flint
15		Microburin		D Long ext	W77/N38-42	3-II		0.24	Flint
16		Microburin		D Long ext	W77/N38-42	3-II		0.24	Flint
17		Microburin		D Long ext	W77/N38	3-II		0.2	Flint
18		Microburin		D Long ext	W77/N38	3-II		0.18	Flint
19	60	Microburin		D	W77/N36	3-II	East	0.4	Flint
20		Microburin		D	W77/N37	3-III	West	0.18	Flint
21		Microburin mishit		D	W77/N35	3-III	West	0.19	Flint
22		Krukowski microburin		D	W77/N36	3-III	East	0.04	Flint
23		Microburin		D	W78/N37	3-IV	East	0.12	Flint
24	61	Microburin		D	W79/N37	3-IV	East	0.14	Flint
25	37	Lanceolate	Late	D 1st ext	W77/N36	3-I		0.34	Carb Limest
26	26	Lanceolate	Late	D	W77/N37	3-II	West	0.07	Flint
27	23	Triangle (broken)	Late	D	W79/N36	3-II		0.06	Flint
28	36	Triangle	Late	D	W77/N36	3-II	West	0.08	Flint
29	35	Triangle fragment	Late	D	W77/N37	3-II	East	0.08	Chert
30	46	Triangle (tail end)	Late	D	W77/N37	3-II	East	0.08	Flint
31		Triangle	Late	D	W78/N35	3-III	West	0.08	Flint
32	19	Triangle		D	W78/N35	3-III	West	0.13	Flint
33	14	Triangle	Late	D	W78/N35	3-III	East	0.16	Flint

34	45	Triangle	Late	D	W79/N35	3-III	East	0.1	Flint
35	22	Isosceles triangle	Late	D	W77/N36	3-II	West	0.15	Greensd Ch
36	17	Small isosceles	Late	D	W78/N36	3-III	East	0.06	Flint
37	25	Isosceles triangle	Late	D	W77/N35	4-I		0.02	Flint
38		Convex backed microlith (broken)	Late	D	W77/N36	3-I		0.09	Flint
39		Convex backed microlith	Late	D Long ext	W77/N47	3-II		0.24	Flint
40	33	Convex backed microlith	Late	D	W77/N36	3-II		0.15	Flint
41	32	Convex backed microlith	Late	D	W79/N36	3-III	West	0.06	Flint
42		Micro tip frag convex backed	Late	D	W77/N37	3-IV	East	0.06	Flint
43	34	Convex backed microlith	Late	D	W77/N35	3-IV	West	0.18	Flint
44	28	Scalene triangle	Late	D Long ext	W77/N43-47	3-I		0.06	Flint
45	27	Scalene triangle	Late	D	W77/N37	3-II		0.04	Flint
46	29	Scalene triangle	Late	D	W77/N35	3-II	East	0.07	Flint
47	20	Scalene triangle	Late	D Long ext	W77/N48-52	3-II 5 b		0.42	Flint
48	13	Scalene triangle	Late	D	W79/N36	3-III	West	0.19	Flint
49	31	Scalene triangle	Late	D	W77/N36	3-III	West	0.12	Flint
50	24	Scalene triangle	Late	D	W79/N37	3-III	West	0.06	Flint
51	21	Scalene triangle	Late	D	W78/N37	3-III	East	0.14	Flint
52	30	Scalene triangle	Late	D	W79/N35	3-III	East	0.04	Flint
53	15	Scalene triangle	Late	D	W77/N36	3-III	East	0.5	Flint
54	16	Scalene triangle	Late	D	W77/N36	3-III	East	0.12	Flint
55	18	Scalene triangle	Late	D	W77/N35	4-I		0.05	Flint
56	43	Narrow str. Backed bladelet (rod)	Late	D	W79/N34	3-II	West	0.04	Flint
57	42	Straight backed bladelet	Late	D	W78/N34	3-II	West	0.09	Flint
58	41	Micro rod	Late	D	W77/N37	3-II	East	0.11	Flint
59		Straight backed bladelet	Late	D	W77/N37	3-II	East	0.08	Flint
60	39	Straight backed bladelet	Late	D	W77/N37	3-III	East	0.09	Flint
61	40	Micro rod (fragment)	Late	D	W78/N37	3-IV	East	0.04	Flint
62	55	Elongated flake	Late	D	W77/N37	3-II	West	5.44	Flint
63		Microlith fragment	Late	D 2nd ext	W77-79/N34-36	3-II		0.04	Flint
64		Microlith fragment	Late	D 2nd ext	W77-79/N34-36	3-II		0.03	Flint
65		Microlith fragment	Late	D	W79/N34	3-II	West	0.7	Flint
66		Microlith fragment	Late	D	W79/N34	3-II	West	0.7	Flint
67		Microlith fragment	Late	D	W77/N37	3-II	East	0.08	Chert
68	44	Microlith fragment	Late	D	W77/N37	3-II	East	0.09	Chert

69		Microlith fragment	Late	D	W78/N35	3-III	East	0.04	Flint
70		Microlith fragment	Unclass	D	W77/N35	4-I		0.07	Flint
71		Microlith fragment		D	W78/N34	4-I	East	0.06	Flint
72		Steeply backed fragment	Unclass	D	W77/N35	3-I		1.16	Chert
73	58	Retouched blade on one margin	Unclass	D Long ext	W77/N74	3-I		1.09	Flint
74		Micro intermediate	Unclass	D Long ext	W77/N38-42	3-I		0.54	Flint
75		Unclassifiable	Unclass	D Long ext	W77/N74	3-I		0.09	Flint
76		Obliquely truncated flake	Unclass	D	W77/N36	3-I		0.27	Flint
77		Retouched blade	Unclass	D 2nd ext	W77-79/N34-37	3-I		3.94	Chert
78		Microlith? Retouched LHS	Unclass	D 2nd ext	W79/N36	3-I		0.89	Chert
79		Blade, casual retouch	Unclass	D 1st ext	W77-79/N34-36	3-II		0.83	Flint
80	*56*	Steeply retouched edges	Unclass	D 2nd ext	W77-79/N34-37	3-I		1.8	Flint
81	*59*	Blade, lightly retouched edge	Unclass	D Long ext	W77/N47	3-II		1.61	Flint
82		Micro mis-hit	Unclass	D 1st ext	W77-78/N34-36	3-II		0.16	Flint
83		Flake, steep retouch	Unclass	D	W78/N37	3-II		1.32	Chert
84		Ecaille	Unclass	D 1st ext	W77-78/N34-36	3-II		2	Flint unpatin
85		Mis-hit	Unclass	D	W77/N37	3-II	East	0.19	Flint
86		Flake, retouched	Unclass	D	W77/N37	3-II	East	0.73	Flint
87		Transverly truncated	Unclass	D	W78/N34	3-II	East	0.15	Flint
88	*7*	Obliquely backed angled retouch	Unclass	D	W79/N35	3-II	East	0.32	Flint
89		Microlith tip	Unclass	D	W77/N37	3-II	West	0.06	Flint
90		Flake, retouched	Unclass	D	W78/N34	3-III (4A)	West	0.38	Flint
91		Flake, casual steep retouch	Unclass	D	W79/N36	3-III	West	1.09	Chert
92	*57*	Blade, retouched with abraded end	Unclass	D	W77/N36	3-IV	West	2.78	Chert
93		Heavy wear/retouch	Unclass	D	W78/N37	3-IV	East	0.74	Flint
94	*51*	Scraper, small	Unclass	D South	W77/N20-29	3-I		1.8	Flint
95	*47*	End scraper on flake	Early	D Long ext	W77/N43-47	3-I		2.13	Flint
96	*62*	Scraper, thumbnail	Unclass	D 1st ext	W77-78/N34-36	3-II		4.33	Flint
97	*50*	Blade end scraper	Early	D Long ext	W77/N38-42	3-II		5.49	Flint
98	*52*	Scraper (end & side)	Unclass	D	W78/N37	3-III		1.2	Flint
99	*49*	Scraper	Unclass	D	W77/N36	3-III	West	6.55	Flint
100	*48*	Scraper	Unclass	D	W77/N35	4-I		3.08	Flint
101		Scraper retouch 2 sides	Neo/BA?	D Long ext	W77/N38-58	3-I		4.27	Flint unpatin
102		Scraper	Neo/BA?	D 2nd ext	W77-79/N34-37	3-I		4.81	Flint unpatin
103		Scraper	Neo/BA?	D 2nd ext	W77-79/N34-37	3-I		4.81	Flint unpatin

104		Scraper	Neo/BA?	D	W77/36	3-II	West	2.92	Flint unpatin
105		Micro-core	Late	D	W78/N34	3-III	East	8.41	Flint
106	63	Micro-core	Late	D	W78/N35	3-III	East	3.23	Flint
107		Micro-core	Late	D	W77/N37	3-IV	West	5.38	Flint
108		Core		D Long ext	W77/N38-42	3-I		21.49	Flint
109		Core		D Long ext	W77/N38-42	3-I		15.05	Flint
110		Core		D 1st ext	W77/N36	3-I		12.52	Flint
111		Core		D	W79/N36	3-II		12.38	Flint
112		Core		D Long ext	W77/N38	3-II		20.21	Flint
113		Core		D	W78/N37	3-II		19.73	Flint
114		Core		D	W77/N34	3-II	East	27.3	Flint
115		Core		D	W79/N35	3-II	East	18.01	Flint
116		Core		D	W78/N35	3-II	East	11.82	Flint
117		Core		D	W77/N36	3-II	West	11.41	Flint
118		Core		D	W77/N36	3-II	West	25.34	Flint
119		Core		D	W79/N34	3-II	West	18.14	Flint
120		Core		D	W77/N47	3-II		8.89	Flint
121		Core		D	W78/N35	3-III	West	9.7	Flint
122		Core		D	W78/N37	3-III	East	20.27	Flint
123		Core		D	W77/N36	3-IV	West	10.26	Flint
124		Core		D	W78/N37	3-IV	East	48.37	Flint
125		Core		D	W77/N36	3-IV	East	12.09	Flint
126		Core		D	W77/N35	4-I		21.09	Flint
127		Core, single platform		D	W77/N350	4-II		12.27	Flint
128	54	Awl		E	W79/N7	3-I		1.2	Flint
129	38	Lanceolate (recent break)	Late	F	W68/N16	3-I		0.32	Flint
130		Crested blade		G	W57/N6	3-I		0.43	Chert
131		French gun flint		I	W82/N18	2-I		9.05	Chert
132		Awl		H	W77/N17	3-III		1.65	Flint
133		Blade, notched RHS		H	W77/N17	3-III		0.35	Flint
							TOTAL	**469.54**	

	BIRDCOMBE: Non-flint							
No.	Description	Early/Late	Trench	Grid Ref	Context	W/E Metre Square	Weight gms	Material
134	Hammerstone		D Long ext	W77/N41	3-III		176.78	Quartzite
135	Retouched flake		H	W77/N17	2-I		14.14	Quartzite
136	Stone with indentation		D	77/N37	3-II	East	89.9	Pennant Sandst
137	Flake		D	W77/N36	3-III	East		Quartzite
138	Flake		D	W77/N36	3-III	East	7.02	Quartzite
139	Flake		D	W77/N36	3-III	West	2.62	Quartzite
140	Flake		D	W78/N36	3-III		26.71	Quartzite
150	Manuport - lozenze		D North ext	W77/N30-34	2-I		48.37	Lias
151	Limonite		D	W79/N37	3-II	West	0.14	Limonite
152	Limonite		D	W79/N35	3-II	West	0.21	Limonite
153	Limonite		D	W78/N36	3-III	West	3.55	Limonite
154	Limonite		D	W78/N37	3-III	West	49.44	Limonite
155	Limonite		D	W79/N37	3-IV	West	7.71	Limonite
156	Limonite		D	W78/N37	3-IV	West	53.15	Limonite
							479.74	

	BIRDCOMBE: Pottery						
No.	Description	Period	Trench	Grid Ref	Context	W/E Mtre Sq	Measurement
157	Thin green glazed, grey fabric	Medieval	D Long ext	W77/N48-52	3-I		106mm x 105mm
158	Thin green glazed, grey fabric	Medieval	D Long ext	W77/N48-52	3-I		108mm x 60mm
159	Black/brown, gritty inclusions	Early Med	D South	W77/N20-30	3-I		202mm x180mm
160	Red/brown, gritty inclusions	Medieval	D	W78/N36	3-II	West	105mm 105mm
161	Red/brown, gritty inclusions	Medieval	D	W79/N35	3-II	East	100mm x 70mm
162	Grey/brown, quartz inclusions	Early Med	H	W77/N17	3-I		300mm x 260mm
163	Red, blackened, large inclusions	Early Med	D Long ext	W77/N48-52	3-II		250mm x 200mm
164	Red tile		D 1st ext	W77-78/N35-36	3-I		133mm x 190mm

BETA

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Mr. Christopher Patri
Deputy Directo

Paula Gardiner

Report Date: 1

Material Received:

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventio Radiocarbon
- 147105	4830 +/- 50 BP	-32.8 o/oo	4700 +/- 50 BF

PLE : BC97DMAIN W79/N36 NO.1
LYSIS : AMS-Standard delivery
ERIAL/PRETREATMENT : (charred material): acid/alkali/acid
MA CALIBRATION : Cal BC 3640 to 3360 (Cal BP 5580 to 5310)

- 147106	5420 +/- 60 BP	-25.1 o/oo	5420 +/- 60 BF

PLE : BC97DMAIN W77/N36 NO.2
LYSIS : AMS-Standard delivery
ERIAL/PRETREATMENT : (charred material): acid/alkali/acid
MA CALIBRATION : Cal BC 4360 to 4060 (Cal BP 6310 to 6010)

ALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-32.8:lab. mult=1)

Laboratory number: **Beta-147105**

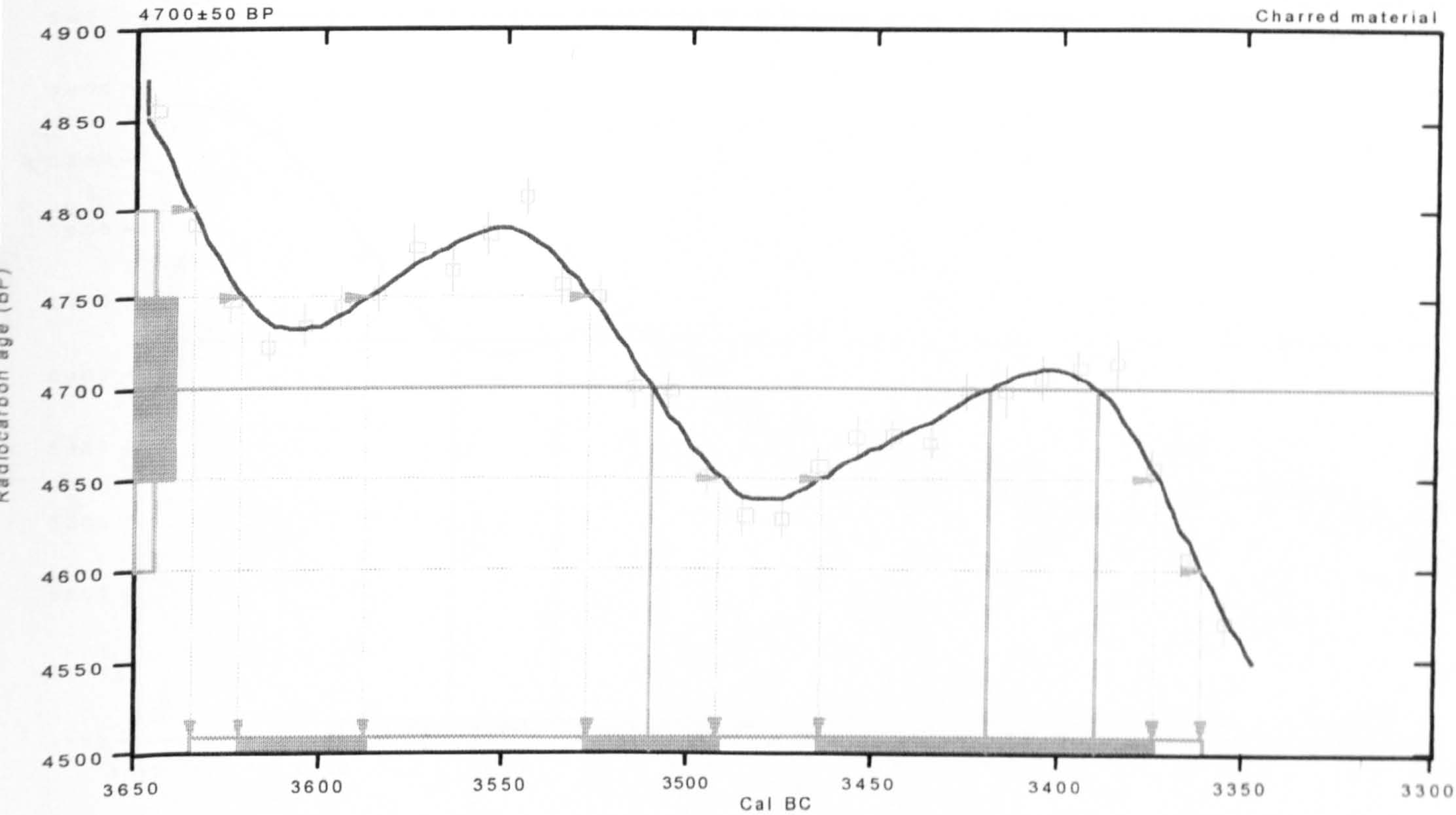
Conventional radiocarbon age: **4700±50 BP**

2 Sigma calibrated result: **Cal BC 3640 to 3360 (Cal BP 5580 to 5310)**
(95% probability)

Intercept data

Intercepts of radiocarbon age
with calibration curve: Cal BC 3510 (Cal BP 5460) and
Cal BC 3420 (Cal BP 5370) and
Cal BC 3390 (Cal BP 5340)

1 Sigma calibrated results: Cal BC 3620 to 3590 (Cal BP 5570 to 5540) and
(68% probability) Cal BC 3530 to 3490 (Cal BP 5480 to 5440) and
Cal BC 3460 to 3370 (Cal BP 5410 to 5320)



References:
Database used

Calibration Database
Editorial Comment
Stuiver, M., van der Plicht, H., 1998, Radiocarbon 40(3), pxii-xiii
INTCAL98 Radiocarbon Age Calibration
Stuiver, M., et. al., 1998, Radiocarbon 40(3), p1041-1083
Mathematics
A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-25.1:lab. mult=1)

Laboratory number: **Beta-147106**

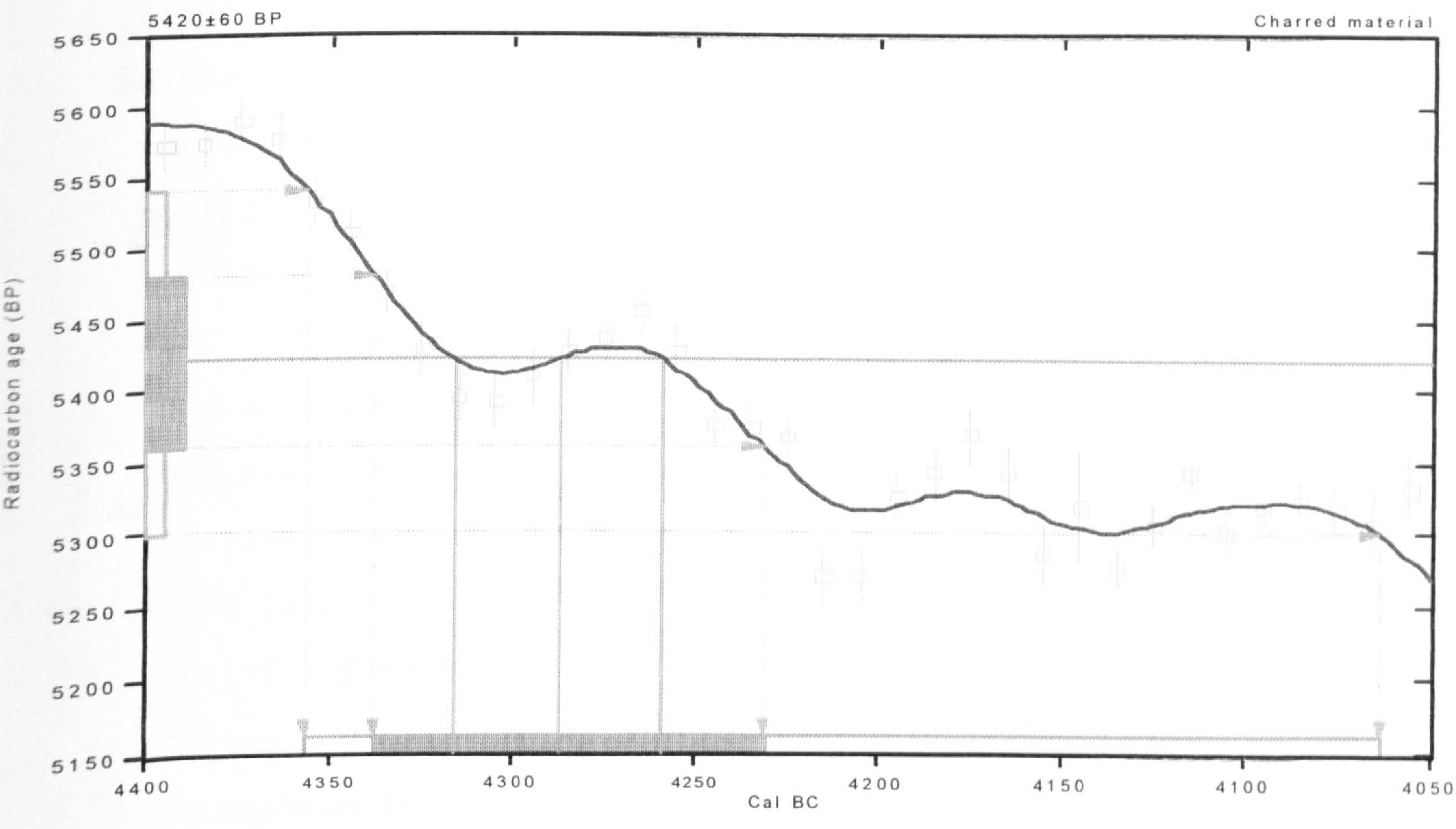
Conventional radiocarbon age: **5420±60 BP**

2 Sigma calibrated result: (95% probability) **Cal BC 4360 to 4060 (Cal BP 6310 to 6010)**

Intercept data

Intercepts of radiocarbon age with calibration curve: Cal BC 4320 (Cal BP 6270) and Cal BC 4290 (Cal BP 6240) and Cal BC 4260 (Cal BP 6210)

1 Sigma calibrated result: (68% probability) Cal BC 4340 to 4230 (Cal BP 6290 to 6180)



References:

Database used

Calibration Database

Editorial Comment

Stuiver, M., van der Plicht, H., 1998, Radiocarbon 40(3), pxii-xiii

INTCAL98 Radiocarbon Age Calibration

Stuiver, M., et. al., 1998, Radiocarbon 40(3), p1041-1083

Mathematics

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HUMAN REMAINS FROM "TOTTY POT" CHEDDAR, SOMERSET.

by

C.B. Denston.

Duckworth Laboratory, of Physical Anthropology,
Department of Archaeology and Anthropology,
University of Cambridge.

The human remains submitted to the laboratory for examination were few in number and rather fragmentary, the only complete bones being a tibia and a radius. After a detailed study of the remains, the conclusion was reached that the bones possibly represented four individuals, but this could be reduced to three. Individual number one may be represented by a complete tibia, a complete radius, and a humerus minus the head. These bones were all of the same light colour, though this in itself cannot be regarded as positive evidence that they are from the same skeleton. The possible sex of the adult individual the bones represented was ~~an adult~~ male, the bones being large and robust and thus making it very unlikely that they were of a female. Using the multiple regression formulae of Trotter & Gleser (1952) for whites, approximate statures from the maximum length measurements of the tibia and radius were reconstructed. These two statures were approximately 5' 7" for the tibia, and approximately 5' 7¾" for the radius, and this evidence seems to give weight to the suggestion that the bones do represent one individual. Platycnemia of the shaft of the tibia was exhibited; this is excessive side to side flattening of the shaft in the region of the nutrient foramen. The tibia-shaft index which is calculated from two dimensions taken at the nutrient foramen came to 49.4 ~~index~~ which is quite low, and makes the shaft in this region very flat. Various explanations, invoking pathological and muscular factors, have been suggested to account for the transverse flattening in tibiae but no positive conclusions have been reached.

Individual number two may be represented by the shaft of a femur minus the proximal and distal extremities, a mid-portion of a shaft of a tibia, and the distal third of a humerus. These three portions of long bones were of a darker colour than the previously described bones, and it seems very unlikely that the humerus, though it is from the opposite side from that of the first humerus, is from the same individual, as the trochlae and condyles and portion of shaft were of smaller dimensions. The portion of shaft of the tibia definitely did not belong with individual number one as both tibiae came from left legs. It is possible, moreover, that none of these three portions of bones were of the same individual at all. The sexing from small portions of long bones such as these is a very speculative procedure, though from a first impression of the femur and humerus they seemed to be of a male, the tibia fragment was impossible to sex. From a closer inspection of the femur shaft the linea aspera was noted as not being as prominent as it usually is in a male, and the dimensions of the shaft were not large, so as these were only portions of long bones preserved and as there was nothing definite to give an indication of sex, the sex could be either male or female. The bones were possibly all adult.

Individual number three could have been represented by an occipital bone, a fragmentary parietal bone, a half of a maxilla with some teeth *in situ* and a loose molar tooth, all of a cranium, and a cervical vertebra. The occipital bone and parietal bone articulate perfectly at the lambdoid suture. By the size of the parietal and occipital bones, and the fact that the occipital bone lacks a prominent external protuberance and strong nuchal lines, it seems likely that the individual they represented was female. The maxilla also was not large, and the four teeth *in situ* were not unduly large for a female. The cervical vertebra seemed to be rather too small to belong to the verbetral column of a male, so taking all the anatomical features of all these bones into consideration, they point overwhelmingly to a female individual. These cranial remains were mainly of a similar colour as the bones representing individual number two, an exception was the occipital bone where the colour was similar to that of both individual one and two. It is most unlikely though that the cranial remains belong to individual one, but it is possible they belong to individual two, mainly because the long bones are less robust than the ones of number one. However, it could be that the cranial remains represent a different individual altogether. The sutures displayed on the parietal and occipital bones suggested that the individual was of a youngish age, possibly under thirty years of age at death, while by the amount of attrition of the teeth in situ in the maxilla, the age of the individual it represented would seem to be in the region of twenty-five to thirty years of age at death. From these two estimates of age it seems more than likely that the parietal and occipital bones and the maxilla are representative of one individual. The loose molar, which is an upper second right molar, had the same amount of attrition as the second left molar in the maxilla, so it seems very probable it belongs to the same maxilla. Seven teeth were present in this half of maxilla at the time of death, the two incisors and canine were lost post mortem, leaving in situ the two premolars and only two molar teeth, the third molar had never formed. No caries were noted in the teeth, and no signs of abscesses were noted in the root sockets for the teeth, but signs of a slight degree of periodontal disease could be detected along the alveloar border of the maxilla.

The fourth individual was possibly represented by a portion of an occipital bone, a right temporal bone, three vertebrae, and two segments of a sacrum. The remains were representative of a very young individual and from certain features of the vertebrae and segments of the sacrum, an age of two to three years seemed to be the possible age at death. From the size and features of the temporal bone, and thickness of the occipital bone, these features were indicative of the remains belonging to an individual of a similar age, so confirming the possibility that all these immature remains were of one individual.

References.

Mildred Trotter and Goldine C. Gleser, "Estimation of Stature from Long Bones of American Whites and Negroes", Amer.J.Phys. Anthrop., N.S., Vol. 10 (1952), pp. 463 - 514.

		TOTTY POT Finds 1998									
		Retouched Flint									
No.	**Illustr. No**	**Description**	**Early/Late**	**Trench**	**Grid Ref**	**Context**	**Weight g.**	**Material**	**Finds No.**	**Sieve**	**Depth**
1	*21*	Lanceolate	Late	2	N10/E2	3-I	0.12	Flint	5		
2	*22*	Lanceolate	Late	2	N10/E2	3-II	0.21	Flint			
3	*23*	Lanceolate	Late	3	N10/E7	3-III	0.28	Flint		Yes	
4	*24*	Narrow microlith (damaged)	Late	2	E1/N10	5	0.22	Flint		Yes	27cm
5		Microlith tip	Late	2	E1/N10	5	0.09	Flint		Yes	27cm
6		Fragment narrow microlith	Late	2	N10/E2	5	0.05	Flint	16		29cm
7		Distal fragment blade/flake		3	E30/N75	3-III	0.06	Flint	2		47cm
8		Proximal frag. Retouched blade		1	N10/W6 S	3-I	1.03	Flint			
9		Proximal frag. Retouched blade		3	E68/N71.5	3-II	1.61	Flint	1		27cm
10		Piece esquilee (end product)		2	E2/N10 SE	3-I	2.63	Flint			
11		Tanged & barbed arrowhead	Beaker	1	W7/N10	3-I	1.01	Flint		Yes	30cm
12		Microlith fragment	Late	2	N10/E2	3-I	0.06	Flint	11		23cm
13		Microlith fragment	Late	2	N10/E2	3-I	0.1	Flint		Yes	
14		Flake, very worn		1	N13/W6	2-I	1.82	Flint			
15		Microlith, broken tip		1	N10/W6	3-II	0.43	Flint	3		28cm
16		Blade end, fire crackled		2	N30/E70	5-I	1.28	Flint	4		
17		Concave base blade LHS retouch		2	N10/E2	6-I	2.12	Flint	6		
		C. Hawkes' spoil heap									
18	*25*	Straight backed bladelet (rod)	Late				0.12	Flint			
19	*26*	Convex backed microlith	Late				0.15	Flint			
20	*27*	Retouched blade					0.27	Flint			
21		Retouched blade					0.2	Flint			
22		Blade (recent break)					4.11	Flint			
						TOTAL	**17.97**				
		Flint waste									
23		Flake	Unclass	3	N10/E7	2-I	0.16	Flint			
24		Proximal blade end	Unclass	3	N10/E7	3-III	2.98	Greensd Ch			
25		Flake	Unclass	3	N10/E7	3-III	0.98	Flint		Yes	
26		Flake, fire crackled	Unclass	1	N10/W6	3-III	1.33	Flint		Yes	
27		Flake	Unclass	1	N10/W6	4-I	0.68	Flint			15-20

28		Blade fragment	Unclass	2	NE baulk	2-I	0.29	Flint		Yes	15cm
29		Spall	BA	2	N15/E1 N	2-I	0.19	Flint			
30		Flake	Unclass	2	N15/E1 N	2-I	0.3	Flint			
31		Chip, fire crackled	Unclass	2	N10/E2	3-I	0.01	Flint	7		23cm
32		Chip	Unclass	2	N10/E2	3-I	0.08	Flint	7		23cm
33		Flake	Unclass	2	N10/E1	5-I	0.73	Flint		Yes	28cm
34		Flake	Unclass	2	N10/E1	5-I	0.2	Flint		Yes	
35		Chip	Unclass	2	N10/E2	6-I	0.07	Flint		Yes	
36		Flake	Unclass	2	N10/E2	6-I	0.91	Flint	9		11cm
37		Spall	BA	2	N10/E2	7-I	0.11	Flint		Yes	
38		Flake	Unclass	2	N10/E2	7-I	0.43	Flint			23
39		Flake	Unclass	4	Lower Plat		0.5	Quartzite			31.5
40		Nodule	Unclass	1	N10/W6	2-I	82.71	Quartzite			
						TOTAL:	**92.66**				
		Non flint finds									
41		Metal rod	Unclass	2	N10/E2	3-I		Metal		Yes	
42		Pottery sherd	Roman	1	N10/W6	4-I		Ceramic		Yes	23cm
43		Pottery sherd	Roman	1	N10/W6	4-I		Ceramic		Yes	23cm
44		Pig tooth	Modern?	1	W7/N10	3-II		Tooth			13cm
45		2 pieces stal		3	N10/7	3-III		Stalagmite			
46		2 pieces sandstone		1	W7/N10	5-I		Sandstone			
47		Quartzite flake	Unclass		Lower Plat			Quartzite			
48		Charcoal		5	Lower Plat	5-I		Charcoal			
49		Charcoal		Spoil	C.H. spoil			Charcoal			
		Bone - C. Hawkes' spoil heap									
50		Adult & juvenile pig			C.H. spoil			Teeth			
51		Frags domestic cow, fox, rabbit			C.H. spoil			Bone			

Resistivity survey at Totty Pot, Cheddar, Somerset.

Site : tpot98 Mesh : tpotm1	Resistivity Survey			Scale	1:738
Shade Plot (Clip)		Size x 0.25		Block	Off
Minimum Maximum Contrast Units	-1 1 1 Std.Dev.	Grey Levels Palette	17 Positive	Black White	High Low

x

10349

Site Name:	Totty Pot cave Cheddar
Period:	*Prehistoric* Mesolithic Neolithic Iron Age
Civil Parish:	Cheddar
District:	Sedgemoor
Area Status:	AONB (M)
Grid Ref:	ST48256356 (ST34SE)

Description:
Excavations for 1960 onwards by the Wessex Caving Club in the entrance of a cave which they called Totty Pot. Human bones were discovered, handed to the police and cremated. From 1963 the explorations were conducted as a joint caving and archaeological project with advice from E.K. Tratman and P.A. Rahtz. Previously thought that the finds may include RB and Bronze Age material but this is not the case. The finds consist of some probably late Neolithic material but the main level is Mesolithic, represented by many flints (1). All the finds are with C.J. Hawkes of the Wessex Caving Club, to be transferred to the UBSS museum (3).

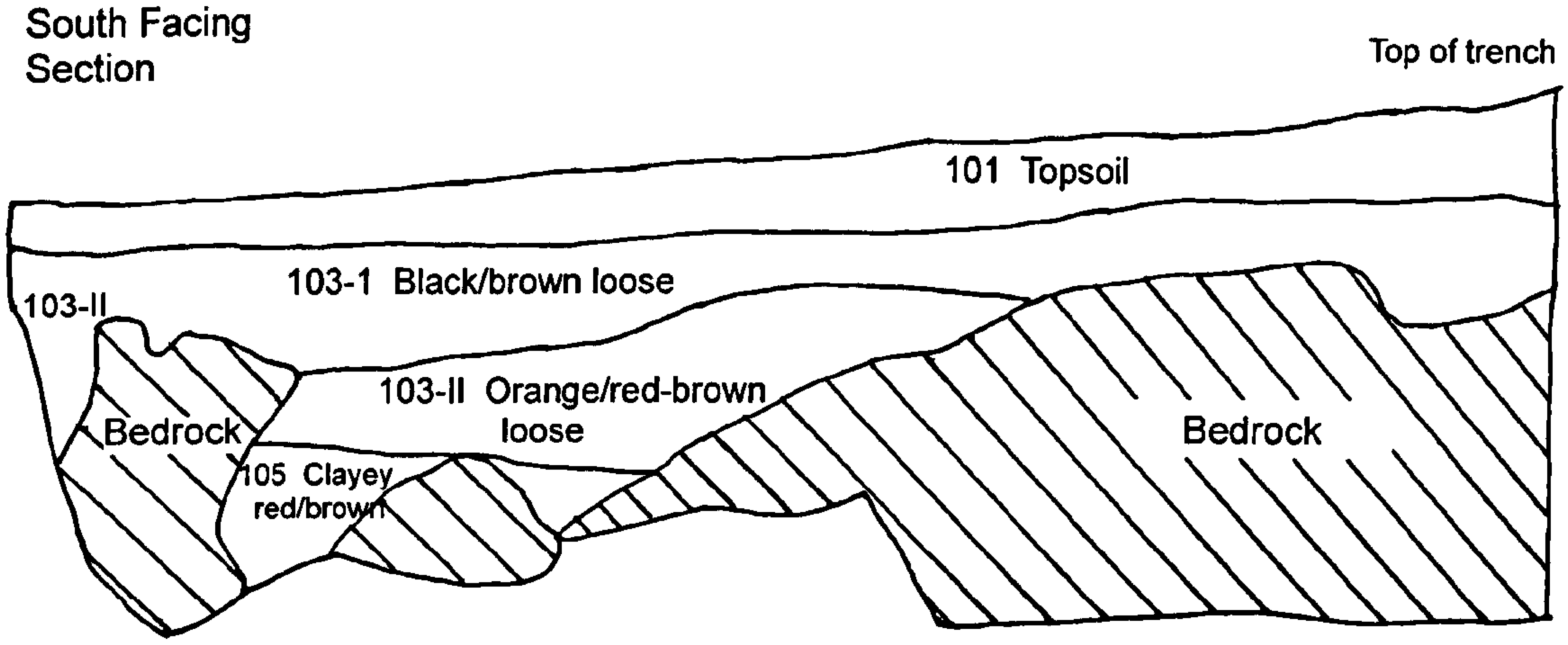
References:

1	Detailed recs	OSAD 1974 ST45SE3 SCPD
2	Mention	Barrington & Stanton 1972 "The Complete Caves of Mendip", 133.
3	Mention	RCHM Excavation Index, 9964

Compilation and updates:
DF 01 83
ED 10 86

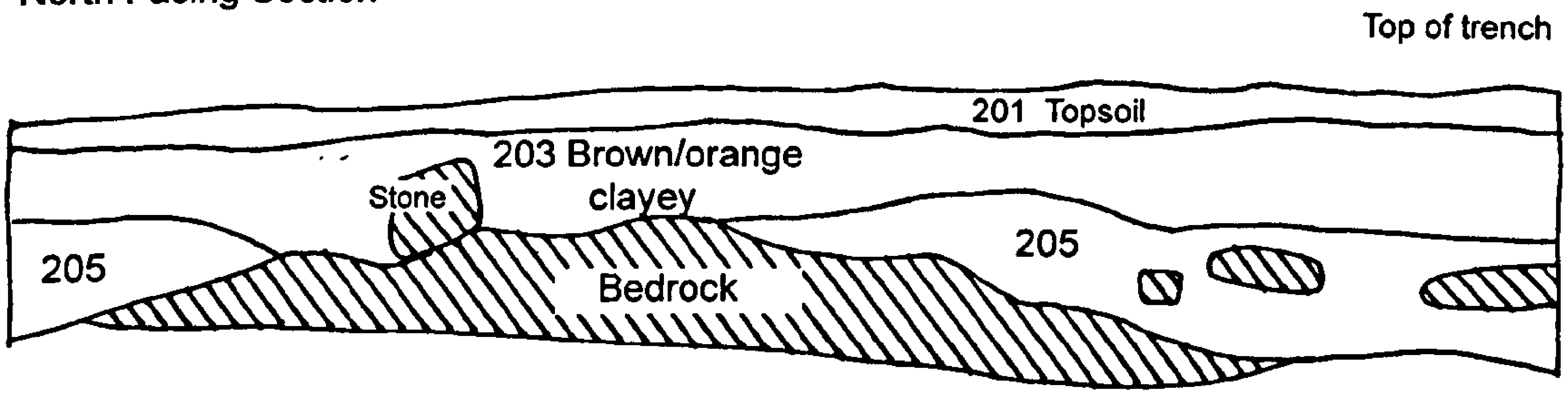
TOTTY POT, CHEDDAR, SOMERSET

TRENCH 1
South Facing
Section



Scale 1:10

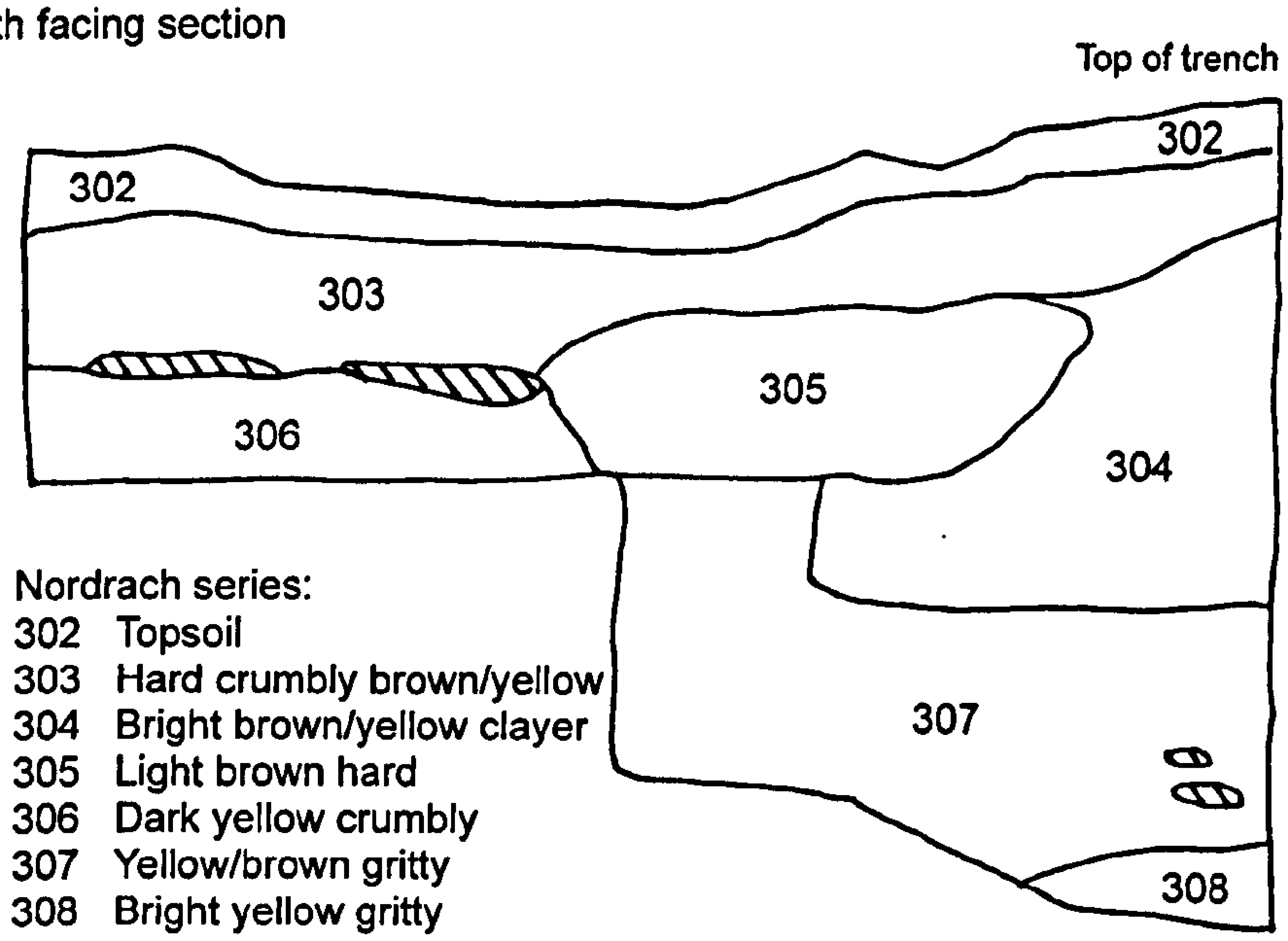
TRENCH 2
North Facing Section



205 Yellow/orange
very clayer

Scale 1:10

TRENCH 3
North facing section



Scale 1:10

SECTION DRAWINGS

Assessment of Museum Flint Collections in North Somerset

WOODSPRING MUSEUM, Burlington Road, Weston-super-Mare

Lower Court Farm, Long Ashton. off Yanley Lane
Published in Bristol & Avon Arch. 1986, No.5. SMR 850. (no flint illustrations).

Alan Saville classified the flint. A significant Mesolithic presence consisting of scrapers (8), microliths (5), microburin (1). Blades and flakes with retouch and edge trimming.
Report says "A significant Mesolithic aspect to the collection". It includes backed blades, scrapers, points, cores. Microliths are early Mesolithic. 350 artefacts found at the farm of a mixed assemblage. No single flint working tradition among the collection.
"The Mesolithic pieces could themselves result from widely separated chronological phases of activity".
The flint is a dark, honey-coloured, almost cherty flint which predominates the collection as though there was only one raw material source (unlike anything found at Birdcombe). Contains large scrapers (Neolithic?). Not many microliths; several small broken blade ends as at Birdcombe. Retouched fabricator 8cm long.
Chris Richards (Woodspring Museum) thinks that the flint comes from the Avon Gravel terraces at Shirehampton and Pill, but I think it is too dark for the Chapel Pill terraces at Ham Green.

Freeman's Farm, Felton, North Somerset.
Fieldwork by University of Birmingham, Edgbaston, B15 2TT. Tel: 0121-414-5513.
Fieldwalking Survey in 1992. Mixed assemblage.
Trial trenches: Depth of soil only 30cm. Plough had disturbed most of it.
Geophysics showed only geology.
Mainly Neolithic activity with some Mesolithic.
Field 2: Microliths (4) but not retouched. Core (1), scraper (1).
Bladelet core (1), flake (1). microscraper (1), Cores (3)
Field 8: Microlith (1); micro-core (1).
Field 9: Microliths (2) Bladelet core (2) Scrapers (3).
Field 3: Thumbnail scraper (1)

Numbers on the list do not tie in with museum bag numbers, but there is a microlithic element in Field 9.
Because the depth of soil is so thin, little would be gained by further excavation. The site shows a Mesolithic presence with later use.

63/383 **Tickenham Hill**: 3 large scrapers (Neolithic?).
Lime Breach
63/364, 379, 381, 378, 380: 5 large scrapers Neolithic.

63/331 **West Wraxall Hill.** Large, thick blade 6cm.

63/338 **Walton Bay, Clevedon.**
3 scrapers (Neolithic) 2 Thumbnail scrapers (possibly Mesolithic).

63/322 **Clevedon Beach**: Scraper – Neolithic
324 **Clevedon Beach below Nann's Hill** – Neolithic (?) scraper 7cm

63/403	Mesolithic bladelet core.

63/373	**Walton in Gordano,** Back Hills.
370/356/	Scrapers, flakes – Neolithic 6cm x 3.5 cm
319/372/391/329	2 flakes – one is a blade – Neolithic.
63/368	**Barrow Common**: large scraper (1) 4.5 x 3.5cm (Neolithic)
320	Retouched blade 3.2 x 0.75 (Mesolithic?)
369	Worked flake (Neolithic).

63/365/323	**Charlcombe Bay, Clevedon** (recorded as Mesolithic)
367/327	Neolithic size: blades, scrapers, flakes.
321/625/406/366	

63/330	**Moat House Farm, Failand**
464	Bladelet core (Mesolithic)

63/384	**Cadbury Camp, Tickenham**
	Neolithic.

63/378/380	**Walton Common:** Scrapers (3) Neolithic. Flakes (2) Neolithic
364/379/381	

63/331	**West Wraxall Hill, Failand.** (1) large blade (Neolithic)

63/376	**Failand Ridge, Failand**
352/362	12 pieces = mainly Neolithic scrapers, shaped flakes.
347	3 possible Mesolithic thumbnail scrapers
63/344	Scrapers, thumbnail (Mesolithic?)
348/351/390/401	
63/328	Saw 4 x 1.5cm (?)

Brian Hack collection
ST515504 850ft OD
Mesolithic tranchet axe (see Rankine's Mesolithic of England).
A surface find in a ploughed field at Priddy, Westbury-sub-Mendip.

Rowberrow Cavern, Rowberrow.
Mesolithic flints. See UBSS, H. Taylor 1920-21; 1924; 1926.

Charterhouse Warren Farm Swallet, Mendip.
Levitan et al. 1988. UBSS 18, (2), 171-239.

Cheddar ST48855570
CBA Arch. Review 1972. A. Everton. Mesolithic scatter including minor Mesolithic element – blades, blade cores and reject flakes. Microlith (1), microburin (1) together with Neolithic element.

Callow Hill, Cheddar, ST44115580
Mesolithic and Neolithic scatter – Portland blades, polished flint axe, Petit tranchet (in Axbridge Museum).

Woodspring also has the **Purchase collection** from fields around Charterhouse-on-Mendip, but in large unprovenanced boxes of waste. Large quantity. Cannot relate it to Purchase's field drawings. All it can tell us is that hunter-gatherers were using the area extensively around Charterhouse-on-Mendip.

AXBRIDGE MUSEUM, King John's *Hunting Lodge,* Axbridge, Somerset. (

The Ann Everton Collection

Dolebury Hillfort, Churchill, N. Somerset
A lot of Neolithic flint waste. Exact provenance (inside/outside the hillfort) is uncertain.

Hay Wood Cave, Hutton, Weston-super-Mare
Everton, A. & Everton, R. 1972. 'Hay Wood Cave Burials, Mendip Hills, Somerset', *Proc. U.B.S.S.* 13 (1), 4-29.
Late Mesolithic flint (on display). More straight backed bladelets (rods) in a tin. See Ann Everton's illustrations in above publication.

Cheddar, south of Mascall's Wood ST46985353
End Scraper (possibly Mesolithic); 2 blade fragments.

Westbury-sub-Mendip ST50505080
1 microlith with backing (Mesolithic)

Ebbor Gorge, Mendip ST5050586
1 backed microlith with Neolithic scrapers and blades.
Brian Hack also found worked flint at the top of the gorge ST532495
The flint collection from Ebbor Gorge was recovered from fieldwalking as the area at the top of the gorge was de-turfed. No exact provenance for the flint, but a general prehistoric presence.

Callow Hill, Cheddar (Ann Everton & Vince Russett) 75/AX/16 1986.
Stack T: Polished flint fragments (Neolithic)
Backed blades
Pottery
Cores/micro-cores/borers, backed blades – blade ends.
Utilised blades, small cores, lots of scrapers, PTD. Great deal of flint.

Crevice Cave, above Axbridge Box 14.
Microliths collected by Mr. Weare, stuck on to card.

Charterhouse – Long Wood E19 83/AX/380/4 Frances Day Box V
A lot of unmarked bags.
Long Wood near Velvet Bottom
Blades, end scraper? Scrapers, thumbnail – Neolithic-Bronze Age. Unclassified blades. Bronze Age knives.

The Brian Hack Collection: Large number of unmarked and unprovenanced boxes. (Needs sorting)

Box 17 (U) 96/Ax/539
96/Ax441 – large querns (not looked at).

Box 39 Misc. T – loose flint. UP and Neo. 88/Ax/478;
86/Ax 451, 457, 458, 469, 470, 472 + Report.

Box U **Abbots Leigh, North Somerset**: Hammerstone.
Box T 75/Ax 16 Box 24
Misc. 223 (Box 42) Borer, scrapers Nr. Priddy ST511509
83/Ax/372 Tower Hill ST563505 2 boxes: Publ. SANHS Vol126 (1982) p.70.

Holly Tree Ref: Top of **Ebbor Gorge** ST532495 83/Ax/381
Neolithic scrapers.

ST509525 Ref: Retrospect, III, September 1988, 10-11.
Macehead (perforated) – does not classify it. In a box with mainly Beaker, some waste together with rocks.

Tower Hill 3, ST563498 Upper Palaeolithic? 88/Ax/488 SANHS (1983) Vol.128.

Purchase Box 83/Ax/351 – Unprovenanced – 1 microlith, cores etc. from the **Charterhouse-on-Mendip** fields.
Box 83/Ax/351 – Unprovenanced. Large amount of waste.

Roger Jacobi: Bracelet Cave/Pulpit Cave in Ebbor Gorge dug by Mason who found a Middle Bronze Age Bracelet and Upper Palaeolithic evidence.

UNIVERSITY OF BRISTOL SPELAEOLOGICAL SOCIETY, University of Bristol, Woodland Road.

Miscellaneous Mendip – catalogued. M.9.

Rowberrow cavern: No microliths surviving due to World War II bombing of Bristol Museum where the UBSS collection was houses. See H. Taylor publications UBSS, 1920-21; 1924; 1926.

Sandford Hill, Sandford, Winscombe, N. Somerset ST43034898 UBSS143
Surface site. Fragments of worked rock crystal (5-6). Not indigenous to the site. Microlith (1). Huge amount of waste. Some Neolithic scrapers. Pottery is probably intrusive. Some of the debitage could be Mesolithic.
Excavators: Marie Clarke, Chris Richards, Ann Everton. It is similar to the Birdcombe waste and the site should be published.

WELLS MUSEUM, Wells, Somerset.

Cabinet 84
A = R.F. Parry flints from Cheddar Caves; B = flints; C = Slab House;
E- Cheddar Hill; F – Surface flints Pitts Farm Priddy; G – Lambert collection.

Ann Everton Collection

Ebbor Gorge, Mendip
Ac No. 21/86
Good quality flint – could be from Beer. Worked quartzite. *Little patination.* Lots of snapped off blade ends.
EV/25 – lots of cores – more particularly microcore.
EV/22 17 small fragments – no re-working
EV/20 Denticulate (early Mesolithic)
EV/4 Blades with cortex – some re-worked. Unclassified.
EV/24 1 patinated microcore (Mesolithic) e/b3
1 patinated microcore, double platform Mesolithic E/B1
EV/7 Microburin
EV/3 Fabricator 21/1986/88
EV/14 Small blades – no secondary working – snapped off ends
EV/15 -do -

General observations: The flint is not patinated. Some large flakes indicate that large nodules were being brought in, as well as small nodules. Good quality flint. I fragment of Portland Chert (waste). Little Greensand chert.

Box 261 B1 A piece similar to that found at Parchey, Chedzoy (see Norman, C. 2001, *forthcoming* 'A Mesolithic to Bronze Age Site near Chedzoy, Somerset', PSANHS. (See my 2000 notebook for illustrations)
EB1 Microlith – lanceolate.

Box 175 **Ebbor Gorge** (probably not Everton) Some Portland Chert; later periods, together with quartzite.
Bag P No- geometric microliths (early Mesolithic)
Bag 5 or S e/B1 - 3 borers (early Mesolithic)
Bag I E/B1 Tranchet arrowheads (Mesolithic?)
Bag M E/A 3 retouched blades.

Rams Pits Quarry Field, Ebbor Gorge
Microlith (1) Small retouch on tip + notch on side.
Most of the collection looks Neolithic to Bronze Age with large cores and scrapers, polished fragments. A lot of waste.

Cooper Collection Box 91 1983.

6 Non-patinated tranchet arrowheads (early Mesolithic)
519 King Down Cheddar Tranchet arrowhead
478 Cheddar Head 'V' roads
574 Middle Down, Cheddar
641 Mendip, Whitwell Corner (Nr. Green Ore)
240 Priddy (slight tang)
428 Mendip

Box 95
Bag P Lias Hammerstone pebble with working chips removed – no provenance.
Palaeolithic flint.

Cooper mentions Shapwick flints.

Hawkes Collection
Box 173
Bag A **Westbury-sub-Mendip**, broken blade end with retouch, possibly Mesolithic

Bag E **Priddy**, Portland Chert, Beer Flint

57/4, Pa/8 6710 Retouched flakes (? early Mesolithic)
Pa/11 End scraper (possibly Mesolithic)
Bag I 5589 **Priddy** Retouched flake (? early Mesolithic)
Bag O Obliquely retouched blade
Bag N **Priddy** HH'71, **Hunter's Henge**
Very patinated retouched blade – not Mesolithic +scrapers and blades.

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